THE BULLETIN

OF THE

AMERICAN CERAMIC SOCIETY

Volume 16 MARCH, 1937 Number 3

PROGRAM

THIRTY-NINTH ANNUAL MEETING

MARCH 21-27, 1937

Hotel Waldorf-Astoria, New York, N. Y.

OSCAR OF THE WALDORF

GREETINGS
To Delegates from
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See page 133 for story of Oscar Tschirky

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Nickel Oxides
Nickel Sulphate
Ochres
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Potassium Carbonate
Potassium Chromate
Potassium Bichromate
Powder Blue
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Sodium Bichromate
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THE BULLETIN OF THE AMERICAN CERAMIC SOCIETY

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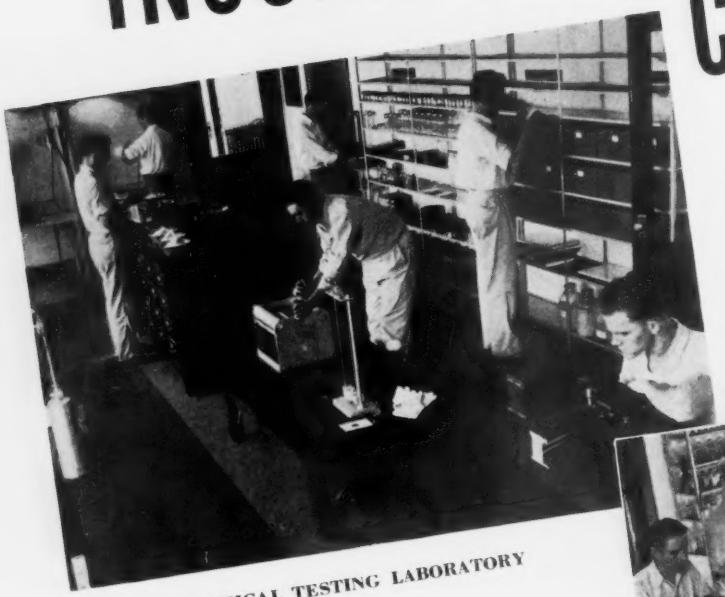

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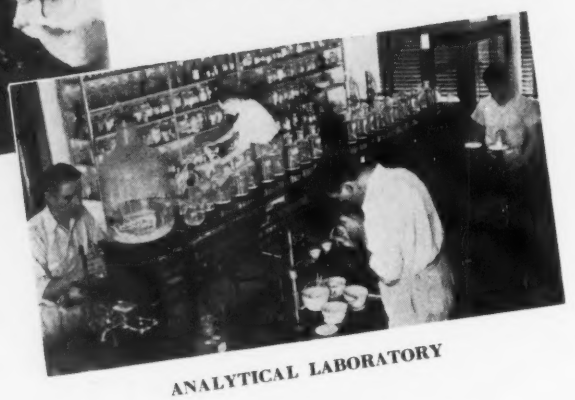

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Edgar Plastic Kaolin Co.
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Spinks Clay Co., H. C.
United Clay Mines Corp.

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Norton Co.
Pittsburgh Plate Glass Co.
Potters Supply Co.

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The Hommel Co., O., Inc.
Pittsburgh Plate Glass Co.
The Vitro Mfg. Co.

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Chicago Vitreous Enamel Product Co.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co.
Metal & Thermit Corp.
The Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Enamels
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Pittsburgh Plate Glass Co.
The Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

Enamel Oxide
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.

Enamels (Porcelain)
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co.
The Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Equipment (Porcelain Enameling)
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
The DeVilbiss Co.
Hardinge Company, Inc.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co.

Exhaust Systems
The DeVilbiss Co.

Feldspar
Ceramic Color & Chemical Mfg. Co.
Consolidated Feldspar Corp.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Paper Makers Importing Co.
The Porcelain Enamel and Mfg. Co.
Sant, Richard C.
The Seaboard Feldspar Co.
The Vitro Mfg. Co.

Fire Brick
Carborundum Co.
Corhart Refractories Co.
Denver Fire Clay Co.
Electro Refractories & Alloys Corp.
Norton Co.

Fire Brick—Process Equipment
Lancaster Iron Works, Inc.

Fire Clay
Kentucky Clay Mining Co.
Spinks Clay Co., H. C.

Flint
Ceramic Color & Chemical Mfg. Co.
Consolidated Feldspar Corp.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Paper Makers Importing Co.
The Porcelain Enamel and Mfg. Co.

Flint Pebbles
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
Consolidated Feldspar Corp.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co.
The Vitro Mfg. Co.

Floors (Non-Slip)
Norton Co.

French Flint
Consolidated Feldspar Corp.
Paper Makers Importing Co.

Frit
Allied Engineering Co.
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co.
Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Fuel Oil Systems and Control, Stokers
Bethlehem Steel Co.
Simplex Engineering Co.

Furnaces
Allied Engineering Co.
Carborundum Co. (*Carboradiant*)
Chicago Vitreous Enamel Product Co.
Denver Fire Clay Co.
The Hommel Co., O., Inc.
Simplex Engineering Co.

Glass Bending Ovens, Glass Decorating Machines
Simplex Engineering Co.

Glass Equipment
Hartford-Empire Co.
Lancaster Iron Works, Inc.

Glass Melting Pots (Open and Covered)
Pittsburgh Plate Glass Co.

Glass Melting Tanks and Furnaces
Pittsburgh Plate Glass Co.
Simplex Engineering Co.

Glass Thickness Gauge
Bausch & Lomb Optical Co.

Glaze and Body Spar
Ceramic Color & Chemical Mfg. Co.
Consolidated Feldspar Corp.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Paper Makers Importing Co.
The Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

Glazes and Enamels
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. H. Chemicals Dept.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
The Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Glaze Spar
Ceramic Color & Chemical Mfg. Co.
Consolidated Feldspar Corp.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Paper Makers Importing Co.

Goggles
Willson Products, Inc.

Gold
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. H. & Chemicals Dept.
The Hommel Co., O., Inc.
The Vitro Mfg. Dept.

Gold Decorations
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Co.

Granulators
Hardinge Company, Inc.
Lancaster Iron Works, Inc.

Grinding Wheels
Carborundum Co. (*Carborundum and Aloxite*)
Chicago Vitreous Enamel Product Co.
Norton Co. (*Alundum-Crystolon*)

Hearths
Carborundum Co. (*Carbofrax* heat treating)
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Norton Co. (*Crystolon*)

Hearths (Fused Al_2O_3, SiC)
Electro Refractories & Alloys Corp.

Hearths (High Aluminous Clay, Electrically Sintered Aluminum Oxide, Silicon Carbide)
Carborundum Co.

Norton Co.

Hose (Air and Fluid)
The DeVilbiss Co.

Iron (Enameling)
American Rolling Mill Co.
Bethlehem Steel Co.

Iron Oxide
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
The Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

Kaolin
Ceramic Color & Chemical Mfg. Co.
Consolidated Feldspar Corp.
Edgar Brothers Co.
Edgar Plastic Kaolin Co.
Hammill & Gillespie, Inc.
The Hommel Co., O., Inc.
Paper Makers Importing Co.
Sant, Richard C.
United Clay Mines Corp.
The Vitro Mfg. Co.

Kellog AA Refractories
Electro Refractories & Alloys Corp.

Kilns, China (Decorating)
Allied Engineering Co.
Denver Fire Clay Co.
Drakenfeld & Co., B. F.
The Hommel Co., O., Inc.
Simplex Engineering Co.

Kiln Furniture (Silicon Carbide, Semi-Silicon Carbide)
Electro Refractories & Alloys Corp.

Kyanite
Celo Mines, Inc.

Kryolith
Ceramic Color & Chemical Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Jungmann & Co.
The Vitro Mfg. Co.

Laboratory Ware
Norton Co.

Lehr Tile (High Aluminous Clay, Electrically Sintered Aluminum Oxide, Silicon Carbide)
Carborundum Co.
Electro Refractories & Alloys Corp.

Lehrs
Simplex Engineering Co.

Lehrs (Electric or Fuel Heated)
Simplex Engineering Co.

Lehr Loaders
Simplex Engineering Co.

Linings (Furnace Refractory, Block Refractory Plate, Brick and Tile)
Carborundum Co.
Chicago Vitreous Enamel Product Co.
Corhart Refractories Co.
Denver Fire Clay Co.
Electro Refractories & Alloys Corp.
Jungmann & Co.
Norton Co.
Pittsburgh Plate Glass Co.
The Vitro Mfg. Co.

Magnesia (Fused)
Electro Refractories & Alloys Corp.

Magnesia (Sintered, Calcined)
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Norton Co.
The Porcelain Enamel and Mfg. Co.

Magnesite
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
Hammill & Gillespie, Inc.
The Hommel Co., O., Inc.
The Vitro Mfg. Co.

Manganese
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc. R. & H. Chemicals Dept.
Hammill & Gillespie, Inc.
The Hommel Co., O., Inc.
The Vitro Mfg. Co.

Manganese (Oxide)
Ceramic Color & Chemical Mfg. Co.
Corhart Refractories Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.

Masks (Breathing)
The DeVilbiss Co.
Willson Products Inc.

Metals (Porcelain Enameling)
American Rolling Mill Co.
Bethlehem Steel Co.

Microscopes (Polarizing)
Bausch & Lomb Optical Co.

Minerals
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
Hammill & Gillespie, Inc.
The Hommel Co., O., Inc.
The Vitro Mfg. Co.

Mixers (Batch)
Lancaster Iron Works, Inc.

Mold Sanders
Lancaster Iron Works, Inc.

Muffles (Furnace)
Allied Engineering Co.
Carborundum Co. (*Carbofrax*)
Chicago Vitreous Enamel Product Co.
Denver Fire Clay Co.
Electro Refractories & Alloys Corp.
Norton Co.
Pittsburgh Plate Glass Co.
Simplex Engineering Co.

Muffles (Laboratory)
Electro Refractories & Alloys Corp.

Mullite (Refractories)
Electro Refractories & Alloys Corp.

Muriatic Acid
Denver Fire Clay Co.
The Hommel Co., O., Inc.

Nitrates (Cobalt, Sodium)
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
The Vitro Mfg. Co.

Non-Gro Refractories
Electro Refractories & Alloys Corp.

Norbide (Norton Boron Carbide)
Norton Co.

Olivine
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.

Opacifiers
Ceramic Color & Chemical Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Metal & Thermit Corp.
The Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Overglaze Colors
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.

Oxides
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Metal & Thermit Corp.
Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Palladium Decorations
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.

Pins
Chicago Vitreous Enamel Product Co.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Potters Supply Co.

Platinum Decorations
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.

Polariscopes
Bausch & Lomb Optical Co.
Simplex Engineering Co.

Porcelain Enameling Service (Practical)
American Rolling Mill Co.
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
Hardinge Company, Inc.
The Hommel Co., O., Inc.
Jungmann & Co.
The Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Porcelain Enamels
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
The Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Potash (Carbonate)
Ceramic Color & Chemical Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Solvay Sales Corp.
The Vitro Mfg. Co.

Producer Glass Plants
Simplex Engineering Co.

Pug Mills
Lancaster Iron Works, Inc.

Pyrophyllite
The Seaboard Feldspar Co.

Pyrometer Tubes
Carborundum Co.
Electro Refractories & Alloys Corp.
Montgomery Porcelain Products Co.

Pyrometer Tubes (Refractory and Hard Porcelain)
Denver Fire Clay Co.
McDanel Refractory Porcelain Co.
Montgomery Porcelain Products Co.
Norton Co.

Pyrometers (Optical, Radiation, Surface, Immersion, Needle)
Pyrometer Instrument Co.

Pyrometric Cones
The Edward Orton, Jr., Ceramic Foundation

Raw Material Handling Equipment
Simplex Engineering Co.
Lancaster Iron Works, Inc.

Refractometers
Bausch & Lomb Optical Co.

Refractories
Carborundum Co.
Corhart Refractories Co.
Denver Fire Clay Co.
Electro Refractories & Alloys Corp.
Kentucky-Tennessee Clay Co.
New Castle Refractories Co.
Norton Co.
Pittsburgh Plate Glass Co.

Refractory Materials
Carborundum Co.
Chicago Vitreous Enamel Product Co.
Corhart Refractories Co.
Denver Fire Clay Co.
Electro Refractories & Alloys Corp.
Kentucky-Tennessee Clay Co.
Norton Co.
Pittsburgh Plate Glass Co.
Sant, Richard C.
Titanium Alloy Mfg. Co.

Represses (Automatic)
Lancaster Iron Works, Inc.

Respirators
Chicago Vitreous Enamel Product Co.
The DeVilbiss Co.
The Hommel Co., O., Inc.
Willson Products, Inc.

Rutile
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Metal & Thermit Corp.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Saggers
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.
Potters Supply Co.

Salt Cake
American Potash & Chemical Co.
The Hommel Co., O., Inc.

Sandblast Helmets
Willson Products, Inc.

Sand Grinder and Sifters
Lancaster Iron Works, Inc.

Saponin
The Hommel Co., O., Inc.

Selenite of Sodium
Drakenfeld & Co., B. F.
The Hommel Co., O., Inc.
The Vitro Mfg. Co.

Selenium
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc.; R. & H. Chemicals Dept.

The Hommel Co., O., Inc.
The Vitro Mfg. Co.

Sheets (Enameling Iron)
American Rolling Mill Co.
Bethlehem Steel Co.

Silica (Fused)
Electro Refractories & Alloys Corp.
The Hommel Co., O., Inc.

Silicate of Soda
Ceramic Color & Chemical Mfg. Co.
Denver Fire Clay Co.
The Hommel Co., O., Inc.

Silicon Carbide
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.

Silicon Carbide Firesand
Carborundum Co.

Sillimanite Refractories
Electro Refractories & Alloys Corp.

Sillimanite (Synthetic)
Pittsburgh Plate Glass Co.

Slabs (Furnace)
Carborundum Co.
Electro Refractories & Alloys Corp.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Norton Co.
Pittsburgh Plate Glass Co.

Soda Ash
American Potash and Chemical Corp.
Ceramic Color & Chemical Mfg. Co.
Denver Fire Clay Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Pittsburgh Plate Glass Co.
Solvay Sales Corp.
The Vitro Mfg. Co.

Sodium Antimonate
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Metal & Thermit Corp.
The Vitro Mfg. Co.

Sodium Fluoride
Ceramic Color & Chemical Mfg. Co.
Denver Fire Clay Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Jungmann & Co.
The Vitro Mfg. Co.

Sodium Silica Fluoride
Ceramic Color & Chemical Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.

Soot Blowers
Simplex Engineering Co.

Special Machines
Simplex Engineering Co.

Spar
Ceramic Color & Chemical Mfg. Co.
Consolidated Feldspar Corp.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Paper Makers Importing Co.
The Vitro Mfg. Co.

Spray Booths
The DeVilbiss Co.

Spraying Equipment
The DeVilbiss Co.

Spurs
Potters Supply Co.

Stacks
Lancaster Iron Works, Inc.

Steel Plate Construction
Bethlehem Steel Co.
Lancaster Iron Works, Inc.

Stilts
Potters Supply Co.

Sulfuric Acid
Denver Fire Clay Co.
The Hommel Co., O., Inc.

Talc
Ceramic Color & Chemical Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
Hammill & Gillespie, Inc.
The Hommel Co., O., Inc.
Paper Makers Importing Co.

Tanks
Simplex Engineering Co.

Tank Blocks
Corhart Refractories Co.
Pittsburgh Plate Glass Co.

Tanks (Pickle)
Chicago Vitreous Enamel Product Co.
The Hommel Co., O., Inc.

Tanks for Raw Material Steel or Concrete
Bethlehem Steel Co.
Lancaster Iron Works, Inc.

Tile (Floor)
Norton Co.

Tile (Muffle)
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.

Tile (Refractory)
Carborundum Co. (*Carbofrax*)
Chicago Vitreous Enamel Product Co.
Denver Fire Clay Co.
Electro Refractories & Alloys Corp.
Norton Co.
Pittsburgh Plate Glass Co.

Tile (Wall)
Denver Fire Clay Co.

Tin Oxide
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Metal & Thermit Corp.
The Vitro Mfg. Co.

Titanium
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
The Hommel Co., O., Inc.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Titanium Oxide
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Metal & Thermit Corp.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Trucks
Lancaster Iron Works, Inc.

Tubes (Insulating)
Carborundum Co.
McDanel Refractory Porcelain Co.
Norton Co.

Tubes (Pyrometer)
Carborundum Co.
Denver Fire Clay Co.
Electro Refractories & Alloys Corp.
McDanel Refractory Porcelain Co.
Montgomery Porcelain Products Co.
Norton Co.
Pittsburgh Plate Glass Co.

Uronium Oxide (Yellow-Orange-Black)
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Vitro Mfg. Co.

Water Softening Plants
Simplex Engineering Co.

Wet Enamel
Ceramic Color & Chemical Mfg. Co.
Chicago Vitreous Enamel Product Co.
The Hommel Co., O., Inc.
Ingram-Richardson Mfg. Co.
The Porcelain Enamel & Mfg. Co.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Whiting
Ceramic Color & Chemical Mfg. Co.
Drakenfeld & Co., B. F.
Du Pont de Nemours, E. I., & Co., Inc. R. & H. Chemicals Dept.
Hammill & Gillespie, Inc.
The Hommel Co., O., Inc.
Paper Makers Importing Co.
The Vitro Mfg. Co.

Winding Drums
Lancaster Iron Works, Inc.

Zinc Oxide
Ceramic Color & Chemical Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
The Vitro Mfg. Co.

Zirconia
Ceramic Color & Chemical Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., R. & H. Chemicals Dept.
The Hommel Co., O., Inc.
Metal & Thermit Corp.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

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More than a hundred ceramic chemicals are active stock items in the Harshaw plants and warehouses. Ranging from spar to brown gold, nearly every chemical used in the ceramic industries is ready for day of order shipment.

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FUEL DATA
for a Large Continuous Bridgewall Tank

Total Days Life (to date)	574	Total Gas to Hold Temperature for Total Idle Days (M)	81,954
Total Producing Days	400	Total Gas Consumed on Operating Days (M)	321,872
Total Glass Delivered (Tons)	44,524	Melting Area Sq. Ft.	627
Total Gas Consumed (M)	403,826	Tons Glass Pulled per Operating Day	111.3
Useful Gas 3000 X Glass Produced (M)	133,572	Rating Sq. Ft./Ton/Day	5.63
Total Gas to Hold Temperature (M)	270,254	Cu. Ft. Gas per Ton of Glass	7,230
Gas to Hold Temperature per Day (M)	471		

WHAT DETERMINES FUEL PERFORMANCE?

ONE of the questions frequently asked the manufacturer of tank blocks is: "What kind of fuel performance can I expect in connection with your products?" That, of course, is a question to ask the tank designer and operator—NOT the supplier of the blocks.* But tabulated above are the fuel figures for a large bridgewall type continuous furnace melting clear flint soda-lime glass—figures which are more or less typical of *properly-designed* tanks, regardless of the materials with which they are constructed. The sidewalls from doghouse to machines were Corhart . . . . . The figures are *not* for some small "spot period"—they are for the first 574 consecutive days of the campaign. ☆ ☆ ☆

***The fuel efficiency of a glass furnace is a matter of engineering, design and operation. It is not a function of the particular materials of which its sidewalls are constructed.**

Studies of fuel performances in various plants and on various fuels show conclusively that furnace design and operation are the controlling factors in fuel efficiency. We would welcome an opportunity to discuss the subject with you. *Address:* Corhart Refractories Co., *Incorporated*, 16th and Lee Sts., Louisville, Ky. *In Europe:* L'Electro Refractaire, Paris. *In Japan:* Asahi Glass Co., Tokio.

QUALITY ECONOMY ENDURANCE

CORHART ELECTROCAST REFRACTORIES

THE BULLETIN
OF THE AMERICAN CERAMIC SOCIETY

A Monthly Publication Devoted to Proceedings of the Society and Promotion of Coöperative Research of Technical, Scientific, and Art Questions

VOLUME 16 **MARCH, 1937** **NUMBER 3**

PROGRAM OUTLINE

THIRTY-NINTH ANNUAL MEETING, AMERICAN CERAMIC SOCIETY

Headquarters for Meetings: Waldorf-Astoria Hotel

March 21 to March 27, 1937, New York, N. Y.

TIME SCHEDULE

Saturday, March 20

2:00 P.M. 8:00 P.M.	Meeting—Board of Trustees	Le Perroquet X

Sunday, March 21

ALL DAY	Registration	Silver Corridor
10:30 A.M.	Committee on Education	Pillement Suite
12:30 P.M.	Luncheon: Board of Trustees and Committees	Le Perroquet
3:00 P.M.	Ceramic Educators	Pillement Suite
6:00 P.M.	Division Officers: Dinner Meeting	Carpenter Suite
6:00 P.M.	Local Section Officers: Dinner Meeting	Pillement Suite
8:30 P.M.	Standards Committee	Assembly Rooms J–K–L
9:00 P.M.	President's Reception	Astor Gallery and Jade Room

Monday, March 22

ALL DAY	Registration	Silver Corridor
10:30 A.M. 2:00 P.M.	General Sessions	Astor Gallery
4:00 P.M.	Fellows of the American Ceramic Society	Basildon Room
6:00 P.M.	School Alumni Reunions	
9:00 P.M.	Get-Together Party	Grand Ballroom or Astor and Jade Rooms

Tuesday, March 23

ALL DAY	Registration	Silver Corridor
9:30 A.M. 2:00 P.M.	Division Meetings	

	Art	West Foyer (3d floor)
	Enamel	East Foyer
	Glass	Le Perroquet Suite (4th floor)
	Materials and Equipment	Basildon Room
	Refractories	Jade Room
	Structural Clay and Terra Cotta	Jansen Suite (4th floor)
	White Wares	Astor Gallery
6:00 P.M.	Publications and Editorial Committeess and Abstracters Dinner Meeting	Assembly Rooms
7:00 P.M.	Student Dinner and Meeting	Le Perroquet Suite
8:00 P.M.	Business Meeting and Installation of Officers	Astor Gallery
9:00 P.M.	Orton Fellowship Lecture	Astor Gallery

Wednesday, March 24

ALL DAY	Registration	Silver Corridor
9:30 A.M. 2:00 P.M.	Division Meetings	
	Art	West Foyer
	Enamel	East Foyer
	Glass	Le Perroquet Suite
	Materials and Equipment	Basildon Room
	Refractories	Jade Room
	Structural Clay and Terra Cotta	Jansen Suite
	White Wares	Astor Gallery
10:00 P.M.	Supper, Show, and Dancing	French Casino
7:30 P.M.	Keramos Dinner	Carpenter Suite
7:30 P.M.	Glass Committee, A.S.T.M.	Pillement Suite

Thursday, March 25

9:30 A.M.	General Session on Ceramic Drying	Astor Gallery
9:30 A.M.	Enamel Division	East Foyer

General Meeting Directory

REGISTRATION: Silver Corridor (3d floor)

WOMEN'S HEADQUARTERS: Assembly Rooms J, K, and L (4th floor). Park Ave. elevators

ALL WEEK: Miss Edna Root, *Adviser*, Waldorf-Astoria Hotel

PRESIDENT'S RECEPTION: Sunday, March 21, 9:00 P.M. Astor Gallery and Jade Room (3d floor)

GENERAL SESSIONS: Monday, March 22, 10:00 A.M. and 2:00 P.M. Astor Gallery (3d floor)

Thursday, March 25, 10:00 A.M. *Subject:* Drying. Astor Gallery

GET-TOGETHER PARTY: Monday, March 22, 9:00 P.M. Grand Ballroom (3d floor)

BUSINESS MEETING AND INSTALLATION OF OFFICERS: ***Induction by Alexander Silverman***, Tuesday, March 23, 8:00 P.M. Astor Gallery

EDWARD ORTON, JR., FELLOW LECTURE: By Robert B. Sosman (see p. 84), Tuesday, March 23, 9:00 P.M. Astor Gallery

Division Meeting Schedules and Directory

(For complete Division Time Schedule see Division Programs, pp. 86–109: author index, p. 110.)

ART: West Foyer (3d floor)
Tuesday forenoon and Wednesday forenoon

ENAMEL: East Foyer (3d floor)
Tuesday and Wednesday, forenoon and afternoon and Thursday forenoon

GLASS: Le Perroquet Suite (4th floor)
Tuesday and Wednesday, forenoon and afternoon

MATERIALS AND EQUIPMENT: Basildon Room (3d floor)
Tuesday and Wednesday forenoon and Tuesday afternoon

REFRACTORIES: Jade Room (3d floor)
Tuesday and Wednesday, forenoon and afternoon

STRUCTURAL CLAY PRODUCTS AND TERRA COTTA: Jansen Suite (4th floor)
Tuesday and Wednesday, forenoon and afternoon

WHITE WARES: Astor Gallery (3d floor)
Tuesday and Wednesday, forenoon and afternoon

Committee Meeting Schedules and Directory

BOARD OF TRUSTEES:
Saturday, March 20 { 2:00 P.M. / 8:00 P.M. } Le Perroquet X (4th floor)
Sunday, March 21, 12:30 P.M. Le Perroquet X (4th floor)
Monday, March 22, 6:30 P.M. Le Perroquet X (4th floor)

EDUCATION COMMITTEE: HAROLD E. WHITE, *Chairman*
Sunday, March 21, 10:30 A.M. Pillement Suite (4th floor)

DIVISION OFFICERS: HOBART M. KRANER, *Chairman*
Sunday, March 21, 6:00 P.M. Carpenter Suite (4th floor)
E. P. POSTE, *General Chairman of Sections and Divisions*
LOCAL SECTION OFFICERS: HAROLD E. WHITE, *Chairman*
Sunday, March 21, 6:00 P.M. Pillement Suite (4th floor)

FELLOWS OF THE AMERICAN CERAMIC SOCIETY: Business Meeting, Monday, March 22, 4:00 P.M. Basildon Room

PUBLICATIONS COMMITTEE, DIVISION EDITORIAL, AND ABSTRACTERS: JOHN D. SULLIVAN, *Chairman*
Tuesday, March 23, 6:00 P.M. Assembly Rooms (4th floor)

STANDARDS COMMITTEE: ARTHUR S. WATTS, *Chairman*
Sunday, March 21, 8:30 P.M. Assembly Rooms (4th floor)

STUDENT DINNER MEETING:
Tuesday, March 23, 6:30 P.M. Le Perroquet Suite

CERAMIC EDUCATORS:
Sunday, March 21, 3:00 P.M. Pillement Suite

GLASS STANDARDS (A.S.T.M.): GEORGE W. MOREY, *Chairman*
Wednesday, March 24, 7:30 P.M. Pillement Suite

KERAMOS
Wednesday, March 24, 6:30 P.M.

SCHOOL REUNIONS
Tuesday, March 23, 6:30 P.M.

ANNUAL MEETING SCHEDULE

Time	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Forenoon		Ceramic Education Committee 10:30 A.M.	General Session 10:30 A.M.	Division Meetings 9:30 A.M.	Division Meetings 9:30 A.M.	Division Meetings Trips	Trips
Noon		Board of Trustees and Committee Luncheons 12:30 P.M.			Division Luncheon Meetings		
Afternoon	Board of Trustees 2:00 P.M.	Ceramic Educators 3:00 P.M.	General Session 2:00 P.M. Fellow Business Meeting 4:00 P.M.	Division Meetings 2:00 P.M.	Division Meetings 2:00 P.M.	Trips	Trips
Dinner		Dinner Meetings of (1) Division Officers (2) Local Section Officers 6:00 P.M.	School Alumni Reunions 6:30 P.M.	Student Dinner Meeting 6:30 P.M. Publications Committee 6:00 P.M.	Keramos Dinner Meeting 6:30 P.M.		
Evening	Board of Trustees 8:00 P.M.	Standards Committee 8:30 P.M. President's Reception Concert 9:00 P.M.	Get-Together Party 9:00 P.M.	Installation of Officers 8:00 P.M. Orton Memorial Fellow Lecture 9:00 P.M.	A.S.T.M. Glass Standards 7:30 P.M. French Casino 10:00 P.M.		

Registration Fee

The registration fee will be $3.00 for men and women; student members, $1.50.

Delegates from the German Ceramic Society

A party of about forty members of the German Ceramic Society will be the guests of the American Ceramic Society on Sunday and Monday.

Food Prices at the Waldorf

The members of the Society are assured that the meals at the Waldorf-Astoria need be no higher than elsewhere. For instance, the Savarin room serves breakfasts at 35 and 40 cents, luncheon at 75 cents, and dinner at $1.00.

The Norse Grill serves breakfast at 75 cents, luncheon at $1.50, and dinner at $2.00.

The men's Bull and Bear Bar serves dinner at $1.50 and $2.00.

Other dining rooms in which music and entertainment are featured are higher priced.

Single rooms (with bath)	$4.50	$5.25	$6.00
Twin bedded rooms (with bath)	7.00	7.50	8.25

WHY NO RAILROAD FARE REDUCTIONS

The following letter has been received from the Central Passenger Association explaining the reasons why railroad certificates granting reduced Meeting fares are not being issued this year. The letter is signed by C. A. Fox, Central Passenger Association of Chicago, and C. L. Hunter, Trunk Line Association of New York.

"Referring to your application for reduced convention fares on account of above occasion:

"Effective June 1, 1936, the railroads in the eastern region of the United States reduced their one-way passenger fares, which were previously constructed on the general basis of 3.6 cents per mile, to 3 cents per mile for tickets good in sleeping or parlor cars and to 2 cents per mile for tickets good in coaches, and the surcharge applicable on tickets good in sleeping or parlor cars was canceled on the same date. This means a total reduction in one-way passenger fare for first-class tickets of about one cent per mile, namely 6 mills per mile reduction in the one-way passenger fare plus the surcharge elimination of approximately 4 mills per mile. The reduction in the cost of tickets good in coaches amounts to 1.6 cents per mile.

"In view of this considerable reduction in passenger fares, the railroads of the Trunk Line and Central Passenger Associations on and after June 1, 1936, discontinued the practice of granting reduced fares for conventions of any character whatsoever. The former general convention concession of one and one-third fare amounted to 2.4 cents per mile which amount, added to the sleeping or parlor car surcharge of approximately 4 mills, produced a total of approximately 2.8 cents per mile, whereas the new regular daily one-way passenger fare is only 3 cents per mile for first-class tickets and 2 cents per mile for coach tickets, or for coach

travel 4 mills per mile less than the previous convention fare.

"For these reasons no reduced convention fares will be authorized by the railroads in Trunk Line and Central Passenger Association territories for the meeting of the American Ceramic Society.

"It is believed that these new regular daily reduced passenger fares will very acceptably accommodate your members, and it is earnestly hoped that the railroads may enjoy their patronage when traveling to and from the place of your forthcoming gathering."

POST-MEETING CRUISE TO HAVANA AND NASSAU, MARCH 27 TO APRIL 4

Following the strenuous activities of technical and committee meetings and social events at the Thirty-Ninth Annual Meeting of the American Ceramic Society in New York, March 21 to 27, inclusive, members are offered a week's cruise to Havana and Nassau. Many members will welcome the rest and change of scene before returning to their business responsibilities.

The following Cruise schedule has been offered by Thos. Cook & Son-Wagons-Lits Inc., of New York, N. Y.

Saturday, March 27: Sail 5 P.M. from New York, Hamburg-American Line SS NEW YORK
Sunday, March 28: At sea
Monday, March 29: At sea
Tuesday, March 30: Arrive Havana about 8 A.M.; the ship is your hotel without extra cost at Havana; time for sightseeing and various other entertainments
Wednesday, March 31: In Havana
Thursday, April 1: Sail from Havana at 1 A.M.
Friday, April 2: Arrive Nassau early morning; time for swimming, golf, and other sports; sail from Nassau at 2 P.M.
Saturday, April 3: At sea
Sunday, April 4: Arrive New York at 4 P.M.

Naussau boys diving for coins.

Fare, $95.00 and up, per person, including transportation, stateroom accommodations, meals, and shipboard entertainment. H. H. Allen, Manager of the Convention Department, Thos. Cook & Son-Wagon-Lits Inc., 587 Fifth Avenue, New York, N. Y. will furnish additional information upon request from members of the Society.

LOCAL COMMITTEES FOR THE THIRTY-NINTH ANNUAL MEETING

Executive Committee

ROBERT B. SOSMAN, *Honorary Chairman:* U. S. Steel Corp., Lincoln Highway, Kearny, N. J.
PERRY D. HELSER, *General Chairman:* General Ceramics Co., RCA Bldg., New York, N. Y.
CHARLES H. PEDDRICK, JR.: United Feldspar Corp., New York, N. Y.
JOHN T. OGDEN: *The Glass Industry*, 11 West 42nd St., New York, N. Y.

Publicity and Public Relations Committee

CHARLES H. PEDDRICK, JR., *Chairman*
MISS RUTH CANFIELD: 55 Morton St., New York, N. Y.
JOHN T. OGDEN
HERBERT P. MARGERUM: Consolidated Feldspar Corp., Trenton, N. J.
ALBERT E. MARSHALL: 501 Fifth Ave., New York City
JOHN R. YOUNG: Merchants Association, New York City
C. N. NICHOLS: New York Visitors' and Convention Bureau

Meeting Service Committee

ROBERT M. CAMPBELL, *Chairman:* New York State College of Ceramics, Alfred, N. Y.
EDWARD KUNZMAN AND NEW YORK STATE COLLEGE OF CERAMICS STUDENTS

Entertainment for Women's Committee

(Includes the wives of the members of this Committee)

WILLIAM W. WINSHIP, *Chairman:* 58 Schenectady Ave., Brooklyn, N. Y.
CHESTER C. TREISCHEL: R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y.
MATTHEW J. SCAMMELL: Scammell China Co., Trenton, N. J.
MRS. W. W. WINSHIP, JR.
MISS EDNA ROOT: The Waldorf-Astoria, New York, N. Y.

Finance Committee

(In addition to members of the Executive Committee)

H. P. SMITH: Joseph Dixon Crucible Co., Jersey City, N. J.

Exhibit Committee

M. J. SCAMMELL, *Chairman:* Scammell China Co., Trenton, N. J.

PAUL BERRYMAN: Crane Company, 47–30 Twenty-Ninth St., Long Island, N. Y.

A. M. MADDOCK: Trenton, N. J.

G. W. JARMAN, JR.: Separations Engineering Co., 110 E. 42nd St., New York, N. Y.

General Entertainment Committee

ROBERT M. CURTS, *Chairman:* American Potash & Chemical Co., New York, N. Y.

IRA SPROAT: R. T. Vanderbilt Co., New York, N. Y.

GEORGE M. BODE: R. & H. Chemicals Co., Empire State Bldg., New York City

ERWIN F. ZEILLERS: B. F. Drakenfeld & Co., 45–47 Park Ave., New York City

J. P. HOENIG: The Waldorf-Astoria Hotel

WILLIAM W. WINSHIP

WALTER J. MERCK: 140–71 Ash Ave., Flushing, N. Y.

Plant Visitation Committee

ROBERT F. SHERWOOD, *Chairman:* United Feldspar Corp., 10 E. 40th St., New York, N. Y.

WILLIAM KELLEY: Standard Sanitary Mfg. Co., Trenton, N. J.

C. B. DELGADO: *The Glass Industry*, 11 West 42nd St., New York City

H. P. SMITH

DAN WHEELER: Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

SUGGESTIONS FOR EFFECTIVE PRESENTATION OF PAPERS*

Repeated criticism of the papers given at our national meetings has long disturbed those who are responsible for the formulation and presentation of divisional programs. The complaints that authors do not arrange material in clear and logical sequence and that they present their work in a dull and tedious manner are all too frequently justified. The large volume of research reported at each meeting necessitates strict limitation of time assigned to the individual author. The problem is a difficult one, but the group of Division officers believes that conditions can be materially improved if authors will coöperate in observing the following suggestions:

(1) Arrangement of Material

Manuscripts as prepared for publication are seldom suitable for oral presentation. The paper should convey clearly to the hearer (*a*) the purpose of the work, (*b*) the experimental method, (*c*) the results obtained, and (*d*) conclusions. The nature of the material and the time available for presentation will determine the degree of emphasis to be placed on each subdivision. The author should make certain by trial against his watch that the essential points can be adequately presented in the time allotted to the paper.

(2) Statement of Purpose

Orient the audience clearly as to the nature and purpose of the work. A lengthy historical review is generally out of place.

(3) Technique

Describe the experimental method employed so as to indicate the principles involved. Omit details of apparatus or procedure unless there is some particularly novel development. Such data may belong in the published paper but will bore your audience.

(4) Statement of Results

Present the results graphically, preferably with diagrams. Lantern slides are more clearly seen than hand-drawn charts. These slides should be of standard size (3.25 by 4 inches) and should project clearly on the screen. Regardless of who has made the charts or slides, try them from the point of view of the audience before presenting them at the meeting. Do not read tables, a procedure which wastes time and destroys interest, but point out the general trend of the data.

(5) Conclusions

Summarize the evidence and discuss the importance of the results or conclusions to the particular field of research involved.

(6) Manner of Presentation

Do not read from a manuscript verbatim. Talk directly to your audience in a clear, loud voice. Do not face blackboard or screen while speaking. Articulate distinctly.

Many exceptions to, and modifications of, the above suggestions will apply in particular instances. Nevertheless general adherence to the points brought out will go far in eliminating the valid criticisms which have been aimed at our divisional programs.

—JOHN H. NAIR, *Chairman, Group of Divisional Officers, American Chemical Society*

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* Reprinted from *News Edition*, American Chemical Society, Aug. 20, 1934.

Acknowledgment is made to Barnett Cohen of the Society of American Bacteriologists for many of the ideas incorporated in these suggestions.

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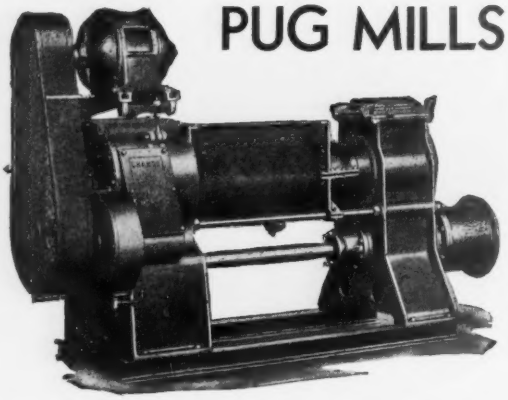

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GENERAL SESSIONS PROGRAM

Waldorf-Astoria Hotel: Astor Gallery

Monday Forenoon, March 22, 1937: 10:30 A.M.–12:00 M.

10:30–11:00 A.M.

1. President's Address

By FRANCIS C. FLINT: Hazel-Atlas Glass Co., Zanesville, Ohio

11:00–11:30 A.M.

2. Perspective and Discovery

By J. G. VAIL: Philadelphia Quartz Co., Philadelphia, Pa.

11:30 A.M.–12:00 M.

3. Silicate Science

By G. W. MOREY: Geophysical Laboratory, Washington, D. C.

GENERAL SESSIONS PROGRAM (continued)

Waldorf-Astoria Hotel: Astor Gallery

Monday Afternoon, March 22, 1937: 2:00 P.M.–5:00 P.M.

2:00–2:30 P.M.

4. The Accrediting of Engineering Curricula by E.C.P.D.

By H. P. HAMMOND: Engineers' Council for Professional Development. 99 Livingston St., Brooklyn, N. Y.

2:30–3:00 P.M.

5. Adsorptive Clays

By P. F. KERR: Dept. of Geology and Mineralogy, Columbia University, New York, N. Y.

3:00–5:00 P.M.

6. Researches Conducted by Tennessee Valley Authority

By THE TENNESSEE VALLEY AUTHORITY CERAMIC LABORATORY STAFF

Progress Report on the Occurrence and Refining of North Carolina Kaolins, Their Use in Vitreous Ceramic Whiteware Bodies, and Results of Experiments Run to Develop a Modified Type of Vitreous Translucent Dinnerware Made from All-American Materials: Parts I–VII

By R. E. GOULD AND ASSOCIATES

This report is a collection of papers dealing with the occurrence and refining of primary North Carolina kaolins, their use in a vitreous china or porcelain-type dinnerware body, some notes on casting and plastic forming of these bodies, and some preliminary results in determining the best firing schedules.

The report also includes a statement of the purposes and aims of the laboratory and a description of the building and part of the equipment.

I, Purpose and Aims
II, Description of the Laboratory

III, A Study of the Primary North Carolina Kaolins and Laboratory Experiments in Refining to Produce a Material Suitable for Use in Vitreous Whiteware

By R. E. GOULD, A. J. HEDQUIST, AND W. B. BOYD

Fifty-one samples of crude North Carolina kaolin from different locations were tested by screen analysis, microscopic examination, and settling tests. Yields appeared to vary widely in the same deposit and from one deposit to another. Indications were that the ultimate products from different crudes would be similar in most respects and that if refined with electrolytes the product would have good characteristics.

A recent geological survey indicates an available known tonnage sufficient to last for many years.

A description is given of laboratory refining which yields a product that probably at least can be partially substituted for English kaolin.

IV, Development of a True Porcelain or China-Type Vitreous Tableware Body Using American Materials

By R. E. Gould and A. J. Hedquist

Specifications are given for an improved body of the true porcelain or china type to include as many as possible of the desirable characteristics without materially increasing the production costs.

Steps in the development of such a body are described. The resultant composition appears to meet the specifications in nearly all cases.

V, Notes on Casting All-Kaolin of the True Porcelain and China Types

By A. J. Hedquist, R. E. Gould, and E. W. Wilson

A description is given of the methods used in casting bodies in which the clay content consists of North Carolina and Florida kaolins and of the effect of various electrolytes on this type of body. The trouble was found to lie in the type of electrolyte used. Sodium carbonate and sodium silicate were unsuccessful, but sodium tannate and sodium gallate and various organic dispersing agents produced casting slips which appeared to have excellent commercial possibilities.

VI, Plastic Forming of Vitreous Bodies of the True Porcelain or China Type, Using American Kaolins as the Plastic Constituents, with Notes on a New Method of Manufacturing Straight Flatware

By R. E. Gould

The plastic forming of bodies, previously described in Parts IV and V, was easily and simply done by the usual semivitreous methods on all articles except flatware which could be jiggered but which deformed in the firing process. A new method is described in which the plates are held rigid during the bisque firing process by braces made from the same body as the plates, supporting the points of the plates which tend to deform due to the pull of gravity or internal stresses. One method of manufacturing these braces is described, which is apparently successful in most of its features. The method appears to be practical in that internal stresses induced during the manufacturing can be disregarded, thus making possible the use of simpler automatic forming machines and devices. Complete success has not yet been obtained, but failures have all been traceable to mechanical defects. Using this method requires a much higher degree of mechanical perfection than is common to the ceramic tableware industry but which is entirely within the bounds of possibility.

VII, Experimental Electrical Firing of True Porcelain and China-Type Bodies Made from American Materials for the Determination of Suitable Schedules

By R. E. Gould and A. J. Hedquist

Hollow and flatware of the average hotel china composition and maturing temperature and a modified hotel china or porcelain body maturing at cone 14 were fired at different rates under different atmospheric conditions. It was found that flatware in bungs must be fired more slowly than the hollow ware, which was to be expected. Schedules for firing flat and hollow ware together are given. Some of the troubles which can be encountered through wrong schedules are noted. The effect of a reducing atmosphere introduced into the kiln while the ware was still porous was found to be a lengthening of the range between zero absorption and overfiring.

INSTALLATION OF OFFICERS

Tuesday Evening, March 23, 8:00 P.M. **Astor Gallery**

Induction by Alexander Silverman: Dept. of Chemistry, University of Pittsburgh, Pittsburgh, Pa.

EDWARD ORTON, JR., FELLOW LECTURE

Tuesday Evening, March 23, 9:00 P.M. **Astor Gallery**

All members and the general public are invited to attend

Subject: Pyrometry and the Steel Makers' Refractories

Speaker, Robert B. Sosman: United States Steel Corporation, Kearny, N. J.

GENERAL SESSION SYMPOSIUM ON DRYING

Auspices of Refractories, Structural Clay, White Wares, and Materials and Equipment Divisions

Waldorf-Astoria Hotel: Astor Gallery

Thursday Forenoon, March 25, 1937: 9:30 A.M.–12:00 M.

9:30–10:00 A.M.

1. Developments in the Technology of Drying

By J. L. Carruthers: Dept. of Ceramics, Ohio State Univ., Columbus, Ohio.

A review and discussion are presented of various researches and developments related to the drying of clays that have been reported in the past several years. The significance and the possible application of some of he findings are also discussed.

10:00–10:30 A.M.

2. Theory of Drying as Applied to Clays

By W. R. Morgan and R. K. Hursh: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

The recent mathematical treatment and interpretation of drying data are shown to be unsatisfactory when applied to the drying of clays.

10:30–11:00 A.M.

3. Comparison of the Drying of Typical Clays and De-Aired Products

By W. R. Morgan and R. K. Hursh: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

Experimental results for kaolin, ball clay, and shale and a comparison of the drying of normal and de-aired stiff-mud refractories are given.

11:00–11:30 A.M.

4. An Investigation of Power Reduction and Moisture Control in Waste-Heat Drying

By J. M. McKinley: North American Refractories Company, Cleveland, Ohio

R. R. Robinson: Robinson Ventilating Co., Zelienople, Pa.

The authors analyzed the conditions existing in a fire-brick drier of the usual continuous waste-heat type. A description of the drier equipment and the results obtained are given. Observations were made on the amount of air flowing through the drier and the pressures and power required for air flow, and the relative humidity of the air entering and leaving the drier is given. Calculations to determine the amount of air at a predetermined temperature required for heating the ware are made, and methods of procedure to reduce power and to control humidity are detailed. An account of the data collected after the changes are put into effect illustrates the possibility of lowering power costs, controlling humidity, and increasing the speed of drying as well as reducing the loss in ware.

11:30 A.M.–12 M.

5. Equations and Quadrant Charts for Determining the Heat and Air Requirements of Driers

By Hewitt Wilson and K. G. Skinner: Univ. of Washington, Seattle, Wash.
(Presented by O. C. Ralston: U. S. Bureau of Mines, New Brunswick, N. J.)

Equations were derived for determining the heat and air requirements of continuous driers or for given periods in a periodic drier. The four types of calculations are as follows: (1) heat balance for the drier from temperature, humidity, and weight data; (2) heat and air requirements when all data are known or assumed, with the exception of the humidity or saturation of the exit vapor; (3) the saturation of the exit vapor under the conditions of (2); (4) temperature required of the hot entering air when all other data are known or assumed. Quadrant charts are given for the graphical solution of the equations. A psychrometric chart and a chart for converting metric to English units are also given.

ART DIVISION PROGRAM

Chairman: L. E. Barringer, General Electric Co., Schenectady, N. Y.
Secretary: C. M. Harder, N. Y. State College of Ceramics, Alfred, N. Y.
Program Chairman: C. M. Harder

Waldorf-Astoria Hotel: West Foyer

Tuesday Forenoon, March 23, 1937: 9:30 A.M.–12:00 M.

1. Control of Crystalline Glazes

By F. H. Norton: Massachusetts Institute of Technology, Cambridge, Mass.

In this investigation, there is carried out the carefully controlled heat treatment of a single crystalline glaze in which both the crystallizing and growth velocity were determined for the four types of crystal produced. It was found possible to produce crystals at any desired location by seeding; their size could be controlled by the growing time and their shape by the growing temperature. Commercial production of crystalline glazes is possible if close temperature control is maintained.

2. Types of Modern Pottery and Tile

By Arthur S. Watts: Dept. of Ceramics, Ohio State Univ., Columbus, Ohio

A presentation of historical data from 1700 A.D. to date with typical body and glaze compositions for use in secondary school instruction is given.

3. Silk-Screen Printing and Its Application to the Dinnerware Industry

By G. H. Stapleford: Homer Laughlin China Co., Newell, W. Va.

The adoption of silk-screen printing for the decoration of glass and dinnerware has created a new field for the designer and decorator. This method of printing has been used many years in the general advertising business but only a short time in ceramics. Its first introduction was in the glass industry, where it has been employed for permanent labels on bottles and glass containers and also for the decoration of glass tableware. Only in the past year, however, has it been successfully applied for the decorating of dinnerware and this chiefly for underglaze patterns. The results have been satisfactory both from an artistic and practical standpoint. A more universal knowledge of the silk-screen process among decorators, however, will hasten its development toward standardization and will give it a rightful place among the more venerated crafts in the artistic field. Many new problems were encountered, owing to the peculiar and novel materials used, and new machines have been devised to make it a practical success. This paper gives a general outline of procedure both in making and preparing the screens and in actual printing.

4. Vitreous Colors: Preparation and Firing Factors

By Theo. Lenchner: Vitro Manufacturing Co., Corliss Sta., Pittsburgh, Pa.

A review and an outline of the constitution of vitreous colors and their manufacture are given. The proper preparation of vitreous color with their media is stressed and the reasons for same are discussed. Some fundamental factors involved in the proper handling and firing of vitreous colored decorated glassware are noted and listed. The paper is based on personal experience of the writer, together with observations in a number of glass plants which are now using vitreous colors on a production basis.

5. Early Porcelain of Italy

(Translation of the first chapters of Le Porcellane Italiane)

Contributed by the Ceramic Engineering Department: Ohio State Univ., Columbus, Ohio

6. Application of the Radiant Gas-Tube Firing System to the Continuous Decorating Kilns

By Philip Dressler: Swindell-Dressler Corp., Pittsburgh, Pa.

In the summer of 1936, recirculating-type radiant gas tubes fired by means of a Kemp carburetor system were substituted in an existing continuous decorating kiln for electric heating elements. Operating results after a six months period have established the equivalent gas and electricity requirements and have shown satisfactory operating results. A second continuous kiln fired by the same system is now under construction. The application of heating to different types of circular and straight kilns is discussed.

ART DIVISION PROGRAM (continued)

Tuesday Afternoon, March 23, 1937: 2:00 P.M.–5:00 P.M.

Visit to the Metropolitan Museum of Art

ART DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: West Foyer

Wednesday Forenoon, March 24, 1937: 9:30 A.M.–12:00 M.

7. New Horizons—and Old—in Ceramic Arts Expression

By Ruth Canfield: Henry Street Settlement, New York, N. Y.

8. Mrs. New York Shops for China and Glass

By Mrs. Alice Waller King

The American Ceramic Society sends a trained investigator, Mrs. Alice Waller King, into the leading department stores of New York City to find the answer to such questions as "what does the typical consumer ask for in buying china and glass? What does the department store try to sell her? What preconceptions does she have as to price and quality? Crystal or colored glass? What types of designs sell most readily?

9. Discussion: "Ceramic Education in Secondary Schools"

10. Discussion: "Is a Federation of Ceramic Clubs or Associations Desirable and Feasible?"

ART DIVISION PROGRAM (continued)

Wednesday Afternoon, March 24, 1937

Visits to points of interest including

(1) Frick Gallery
(2) Hispanic Museum (Spanish Luster Ware)
(3) Indian Museum
(4) Academy of Design

Friday Evening, March 26, 1937: 7:30 P.M.

Art Division Dinner under the Sponsorship of the New York Society of Ceramic Arts
The dinner will be at the National Arts Club: 15 Gramercy Park, New York City.
(Tickets will be available at the Registration Desk.)

ENAMEL DIVISION PROGRAM

Chairman: G. H. McIntyre, Ferro Enamel Corp., Cleveland, Ohio
Secretary: B. J. Sweo, Ferro Enamel Corp., Cleveland, Ohio
Program Committee: *Chairman*, F. R. Porter, Inland Steel Co., Indiana Harbor, Ind.
G. H. Spencer-Strong, Porcelain Enamel & Mfg. Co., Baltimore, Md.
Karl Kautz, Republic Steel Corp., Massillon, Ohio
W. G. Martin, A. O. Smith Corporation, Milwaukee, Wis.

Waldorf-Astoria Hotel: East Foyer

Tuesday Forenoon, March 23, 1937: 9:30 A.M.–12:25 P.M.

Applied Research

9:30–9:55 A.M.

1. Behavior of Enamels in Contact with Solutions at High Temperatures

By P. C. Stufft and G. H. Spencer-Strong: Porcelain Enamel & Mfg. Co., Baltimore, Md.

The effect of various electrolytes in dilute solution upon several types of porcelain enamel at 150°C was determined. Possible practical applications of the results are discussed.

9:55–10:20 A.M.

2. Controlled Variables of Frit Composition and Their Relation to Enamel Consistency

By G. H. McIntyre and R. E. Bevis: Ferro Enamel Corp., Cleveland, Ohio

The sodium carbonate and borax ratio of a ground composition were varied to give variable frit solubility. The relationship between the frit solubility and the enamel-slip consistency was studied. Definite relationships between consistency and Na_2O and B_2O_3 content of the mill liquor are shown.

10:20–10:45 A.M.

3. Effect of Enamel Composition on the Chipping of Porcelain Enamel

By J. E. Rosenberg and A. Langerman: O. Hommel Co., Pittsburgh, Pa.

An attempt has been made to correlate chipping with the composition and physical properties of vitreous enamel. A series of cover-coat enamels was prepared, whose expansions have been measured both by the interferometer and ring methods, and these were applied on a series of ground coats having different physical properties and compositions. Thermal shock tests and chipping tests were made. This work indicates that enamels which will withstand the usual chipping test are not resistant to thermal shock. More specifically, it has been found that cover-coat enamels having a low coefficient of expansion give better results for thermal shock but have poorer resistance to chipping. In the case of ground coats, it was found that the higher the expansion of the ground coat, the more resistant it is to thermal shock.

10:45–11:10 A.M.

4. Surface Tension and Consistency of Typical Commercial Enamels at and near Firing Temperatures

By W. N. Harrison and D. G. Moore: National Bureau of Standards, Washington, D. C.

This paper is a final report on consistency, supplementing a progress report given at the Thirty-Eighth Annual Meeting of the Society. The apparatus and methods of test used for determining surface tension are described and some typical results are given.

11:10–11:35 A.M.

5. Some Factors Influencing Stain Resistance

By G. H. Spencer-Strong: Porcelain Enamel & Mfg. Co., Baltimore, Md.

The effect of metal gage, firing time and temperature, application procedure, and drying upon the stain resistance of three acid-resistant enamels of widely divergent composition was investigated. The effects of the various factors on the opacity and scratch resistance of the same enamels are also reported.

11:35 A.M.–12:00 M.

6. Comparison of Frit Composition as Calculated from Batch Weights and Determined by Analysis: I, Sheet-Iron Ground Coats

By Emerson P. Poste: Consulting Engineer, Chattanooga, Tenn.

The analyses of several ground-coat frits smelted from known batches are given and a comparison is made between the theoretical and actual frit compositions.

12:00 M.–12:25 P.M.

7. Chemistry of Some Phases of the Processing of Cast Iron for Enameling Purposes

By R. M. King: Dept. of Ceramics, Ohio State Univ., Columbus, Ohio.

A review and analysis of the available knowledge regard-

ing the presence of oxygen and sulfur in cast iron are given, and the thermodynamics of the reactions involved in deoxidation and desulfurization is considered. Some suggestions as to the possible relation between some of these reactions and the blistering of cast iron are offered. The rôle of manganese as a deoxidizer and a desulfurizer and the differential deoxidizing powers of the elements in cast iron are discussed in detail.

ENAMEL DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: East Foyer

Tuesday Afternoon, March 23, 1937: 2:00 P.M.–4:55 P.M.

Applied Research (continued)

2:00–2:25 P.M.

8. Study of the Metallographic Characteristics and Enameling Qualities of Certain Cast Irons

By R. B. Schaal: Ferro Enamel Corp., Cleveland, Ohio

The enameling properties of three different irons are described. Analyses are given and photomicrographs are shown, depicting the structure of each iron near the surface and before and after enameling. Structural changes during enameling are described and discussed as to possible influence on enameling properties. It is shown that (1) one iron anneals perfectly during enameling with no apparent surface alteration, (2) another anneals perfectly but shows surface decarbonization, and (3) the third sample does not anneal perfectly. Sample No. 1 enamels better than Nos. 2 and 3.

2:25–2:50 P.M.

9. Effect of Manganese, Nickel, and Cobalt Oxides upon the Adherence and Reboiling Properties of a Ground Coat

By E. E. Howe and R. L. Fellows: Chicago Vitreous Enamel Product Co., Chicago, Ill.

A series of enamels was compounded in which small amounts of adherence-promoting oxides were varied, and their effect upon the adherence and reboiling properties of a base enamel glass applied to steel was studied. Results indicated that cobalt oxide was necessary in producing adherence, whereas nickel and manganese oxides increased the firing range. Reboiling was found to be dependent upon adherence. Photomicrographs showed that different phases existed in the interfacial layer when the different metallic oxides were introduced into the enamel.

Shop Practice

2:50–3:15 P.M.

10. Effect of Firing Procedure on the Crazing Resistance of Cast-Iron Enamels

By P. C. Stufft: Porcelain Enamel & Mfg. Co., Baltimore, Md.

The effect of varying the firing time and temperature of first and second coats of several types of cast-iron enamels upon their crazing resistance under heat was investigated.

3:15–3:40 P.M.

11. Grinding of Dry-Process Enamel and Its Effect on Working Properties

By M. E. Manson: Chicago Vitreous Enamel Product Co., Cicero, Ill.

Dry-process enamels ground to varying degrees of fineness, both with and without the presence of small amounts of moisture, were checked for tendency to cling to the balls and mill lining, loss by convection currents, and speed with which they could be put through a vibrated screen. The presence of extremely small amounts of water during grinding has a marked effect on all of these properties.

3:40–4:05 P.M.

12. Preliminary Investigation of the Rusting of Cast Iron

By P. C. Stufft: Porcelain Enamel & Mfg. Co.

A survey of the causes of rusting in cast iron during the drying of the base coat was made. The effect of various electrolytes upon rusting was determined.

4:05–4:30 P.M.

13. Characteristics of Sheet Metal for Porcelain Enameling

By F. R. Porter and J. H. Nead: Inland Steel Co., Indiana Harbor, Ind.

The chemical and physical requirements of porcelain enameling sheets are presented. It is explained why the most satisfactory base metal for enameling purposes is one low in carbon, manganese, sulfur, phosphorus, and silicon. Thermal expansion curves and pertinent photomicrographs are shown.

4:30–4:55 P.M.

14. An Unusual Application of Automatic Spraying of Vitreous Enamel Slip

By Wesley G. Martin: A. O. Smith Corporation, Milwaukee, Wis.

A description is presented of the self-contained automatic spraying machine, assembly problems, and practical operating problems. The economical and practical advantages are discussed as compared to manual spraying.

ENAMEL DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: East Foyer

Wednesday Forenoon, March 24, 1937: 9:30 A.M.–12:30 P.M.

9:30–9:55 A.M.

15. Vitreous Enameling in Radiant Tube Furnaces

By W. O. Owen: Surface Combustion Co., Toledo, Ohio

Physical Testing

9:55–10:20 A.M.

16. Use of the Water Elutriator in Addition to Screen Tests in Determining Fineness Distribution of Milled Enamel

By L. A. Lange and R. L. Fellows: Chicago Vitreous Enamel Product Co., Cicero, Ill.

A method of using a water elutriator in combination with screen tests to determine the fineness distribution of milled enamels is described. Results on the tests of milled enamels which were ground under various conditions are given.

10:20–10:45 A.M.

17. New Method of Testing Acid Resistance of Enamels

By E. E. Bryant: Ferro Enamel Corp., Cleveland, Ohio

The apparatus and method designed for a boiling acid-resistance test fulfilled the following requirements: (1) the temperature of the acid solution is controlled; (2) the volume of the acid solution is maintained constant by eliminating evaporation; (3) the acid attack is confined to a definite area of surface; (4) the acid solution is not weakened by attack on surfaces not pertinent to the test; and (5) a weighed sample may be used to determine the weight of enamel removed by acid attack, or loss of gloss may be determined. Data are included to show the accuracy and general possibilities of the test.

10:45–11:10 A.M.

18. The Development of a Multiple-Purpose Photoelectric Reflectometer

By Richard S. Hunter: National Bureau of Standards and George Washington Univ., Washington, D. C.

At the 38th Annual Meeting of the American Ceramic Society, a photoelectric reflectometer was described which was designed to measure normal 45° apparent reflectance.[1] Because this instrument employed a null method and was relatively simple in design, it proved to be well adapted to handling a number of reflectance problems, *e.g.*, the determination of the opacity of porcelain enamels.[2] Since the completion of this earlier instrument, a number of problems have arisen, the solution of which has required modification of the earlier design. In the development of a new "multiple-purpose" reflectometer, it has been the intention to keep certain desirable features of the previous apparatus, but at the same time to modify the design so that the new apparatus will be more generally applicable and will be freer from sources of trouble than the earlier equipment. A basic feature of the old apparatus was the two-cell, series circuit with galvanometer to indicate when the current from one of the photoelectric cells was greater than from the other. This feature has been retained. A single source of light is still used, but this source is now stationary and one of the cells, the "45° normal reflectance" cell, is movable to give approximate inverse-square compensation. The reflectance scale moves with this cell. Light directed to the other cell follows a "45°–45° gloss" beam. The apparatus has been designed to measure 45° normal apparent reflectance as did the previous instrument, 45°–45° specular gloss,[3] and contrast gloss.[3] Gibson[4] has recently pointed out certain principles underlying the proper design of photoelectric instruments intended for colorimetric measurements, and these principles have been carefully adhered to in the development of the present apparatus. Experience so far indicates that the new apparatus is well suited to the measurement of color differences. The instrument and a number of its features is to be demonstrated.

[1] For abstract see R. S. Hunter, "A Null Method Photoelectric Reflectometer," *Bull. Amer. Ceram. Soc.*, **15** [3] 79 (1936).

[2] "Tentative Standard Reflectance Test for Opaque White Porcelain Enamels," Technical Research Section, Porcelain Enamel Institute, Chicago, Ill., June, 1936.

[3] R. S. Hunter, "Methods of Determining Gloss," *Jour. Research Nat. Bur. Stand.*, **18**, 19 (1937); (R. P. 958).

[4] Nat. Bur. Stand. *Letter Circ.*, LC-473 (July 9, 1936).

11:10–11:35 A.M.

19. Testing Enamels for Acid Resistance

By W. N. Harrison and L. Shartsis: National Bureau of Standards, Washington, D. C.

The results of experimental work incident to the development of test methods and of criteria for classifying enamels according to acid resistance are presented. "Room temperature" tests for enamels used at ordinary temperatures and boiling tests for enamels used on cooking utensils were studied. A visual system of classification and also an evaluation of the degree of attack by photoelectrically measured loss of gloss of the specimens were used to determine the effects of various factors, including (*a*) firing temperature, (*b*) temperature during treatment with acid, (*c*) strength of acid solution, (*d*) duration of acid treatment, (*e*) age of acid solution at time of treatment, (*f*) presence of specimens of low acid resistance in the same test solution with specimens of high resistance, and (*g*) humidity of the atmosphere during inspection of specimens.

11:35 A.M.–12:30 P.M.

20. Reports of Committees

(a) Standardization of Tests

(b) Research

(c) Data

ENAMEL DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: East Foyer

Wednesday Afternoon, March 24, 1937: 2:00 P.M.–5:00 P.M.

Round-Table Discussions: Enamel Defects

2:00–3:00 P.M.

21. Adherence Defects

By H. W. Alexander: Frigidaire Div., General Motors Corp., Dayton, Ohio

3:00–4:00 P.M.

22. Black-Edge Defects

By P. E. Gerdes: Tennessee Enameling Co., Cleveland, Tenn.

4:00–5:00 P.M.

23a. Copperheads

By T. D. Hartshorn: A. J. Lindemann & Hoverson Co., Milwaukee, Wis.

23b. A Consideration of Copperheads

By L. K. Sosey: Seeger Refrigerator Co., St. Paul, Minn.

Copperheads are considered as an ever-present condition existing in a ground-coat enameling process, that does not appear as a defect until the resistance of the process is decreased to the point where the copperheading tendency is the more powerful and predominates. By the use of various types of pickle, steels, ground coats, furnace atmospheres, and spacings of ware in the furnace, conditions were produced that had varying degrees of resistance to copperheading. Their relative importance in causing or preventing copperheads was studied, and it was shown how a condition on the verge of producing copperheads could be used as a "copperheadometer" to indicate the influence of any change on the ground-coat process, in increasing or decreasing the process resistance against copperheading.

23c. Copperheading

By H. C. Beasley: Ferro Enamel Corp., Cleveland, Ohio

ENAMEL DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: East Foyer

Thursday Forenoon, March 25, 1937: 9:30 A.M.–12:30 P.M.

Round-Table Discussions: Enamel Defects (continued)

9:30–10:25 A.M.

24. Cover-Coat Blisters

By E. C. Aydelott: Benjamin Electric Co., Des Plaines, Ill.

10:25–11:20 A.M.

25. Cause and Control of Hairlining in Enameled Pressed-Steel Shapes

By E. C. Greenstreet: Standard Gas Equipment Corp., Baltimore, Md.

Basically, hairlining finds its origin in improper design or fabrication and may also be caused by the use of improper methods of enameling. Some factors in design, which have been found conducive to hairlining, together with corrective measures used in design and enameling to overcome the defect, are discussed.

11:20 A.M.–12:15 P.M.

26. Shorelines

W. V. Knowles, (leader): 1150 Sylvania Road, Cleveland Heights, Ohio

12:15–12:20 P.M.

27. Report of Committee on Nominations

12:20–12:30 P.M.

28. Installation of Officers

Additional Title

29. Porcelain Enamel in the Architectural Field

By George P. MacKnight: Porcelain Enamel Institute, 612 N. Michigan Ave., Chicago, Ill.

GLASS DIVISION PROGRAM

Chairman: J. S. Gregorius, Pittsburgh Plate Glass Co., Creighton, Pa.
Secretary: S. R. Scholes, New York State College of Ceramics, Alfred, N. Y.
Program Chairman: A. N. Finn, National Bureau of Standards, Washington, D. C.

Waldorf-Astoria Hotel: Le Perroquet Suite

Tuesday Forenoon, March 23, 1937: 9:00 A.M.–12:15 P.M.

9:00–10:00 A.M.

1. Henry Le Chatelier: His Life and Work

By Alexander Silverman: Dept. of Chemistry, Univ. of Pittsburgh, Pittsburgh, Pa.

Le Chatelier's ancestry, which played an important part in determining his scientific career, is first discussed; then his education, family, and the family life. The subject matter covered in more than 450 articles, which he contributed to various journals, is outlined. His books are reviewed. His contributions to practical and theoretical science are covered, including his inventions, namely, the metallurgical microscope and high-temperature pyrometers. Honors which he received are listed. His final interest in social welfare is indicated. A bibliography of journal articles is appended.

10:00–10:30 A.M.

2. Effect of Certain Oxide Additions on the Surface Tension of Glass

By A. E. Badger and C. W. Parmelee: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

A report is given on the effect of additions of various glass-forming oxides on the surface tension at 1200° and 1350°C of a soda-lime glass. Determinations were made by the Jaeger maximum bubble-pressure method as modified by Parmelee, Lyon, and Harman.

10:30–11:00 A.M.

3. Elastic and Viscous Properties of Several Soda-Silica Glasses in the Annealing Range of Temperature

By Nelson W. Taylor and Paul S. Dear: Dept. of Ceramics, Pennsylvania State College, State College, Pa.

Measurements have been made on stabilized glass fibers of four compositions in the system soda–silica, at several temperatures in the annealing range, to obtain the viscosity, Young's modulus for instantaneous and total elasticity, and the rate of delayed elastic distortion for each glass. Values for the activation energy for viscous flow and delayed elastic distortion have been derived from the temperature coefficients. An ionic theory of the elastic and viscous processes and a discussion of binding energies in the system soda–silica are presented.

11:00–11:15 A.M.

4. Refractive Indices of Some Glasses in the Ternary System $K_2O{\cdot}4SiO_2$–Fe_2O_3–SiO_2

By George T. Faust: Dept. of Ceramics, Rutgers Univ., New Brunswick, N. J.
Albert B. Peck: Mineralogical Lab., Univ. of Michigan, Ann Arbor, Mich.

In the course of some phase-rule investigations of the ternary system $K_2O{\cdot}4SiO_2$–Fe_2O_3–SiO_2 by the "quenching method" of Shepherd, Rankin, and Wright, the refractive indices of 30 glasses were measured by the usual petrographic immersion method. The refractivities varied from 1.438 for a $K_2O{\cdot}7SiO_2$ glass to 1.621 for the most ferriferous glass which contained 32.3% Fe_2O_3. The maximum FeO content reached a value of 0.33% in a glass originally containing 25.0% Fe_2O_3. Along the sections $K_2O{\cdot}4SiO_2$, $K_2O{\cdot}5SiO_2$, $K_2O{\cdot}6SiO_2$, and $K_2O{\cdot}7SiO_2$, the relation between the Fe_2O_3 content of the glasses and the refractive index is apparently linear. The isofracts, however, in the ternary system are curved lines.

11:15–11:30 A.M.

5. Base Release of Some Commercial Glasses as Determined by Electrodialysis

By R. M. King: Dept. of Ceramics, Ohio State Univ., Columbus, Ohio

Glasses tested for chemical durability by the tentative "No. 1 powder method" of the Glass Division of the American Ceramic Society were electrodialyzed in such a way that the base release at regular time intervals was obtained. The method used provided data for plotting curves showing the rate of base release. The details of the method used are described and a brief explanation of the theory of electrodialysis is given. Data obtained are compared with those obtained by the "powder method" and are analyzed as to limits of error.

11:30–11:45 A.M.

6. The "Sessile" Drop Method: I, Determination of Surface Tension and Density of Viscous Liquids at High Temperatures

By Bennett S. Ellefson and Nelson W. Taylor

An apparatus is described which allows measurements to be made of the exact dimensions of a "sessile" drop of liquid, resting on an inactive surface, at temperatures up to 1300° or 1400°C, and *in vacuo* or in any desired gas medium. Under these conditions, surface tension and gravity are the only forces acting on the drop, and the exact shape, surface, and volume may be computed from

the tables of Bashforth and Adams. The method may be used with liquids having viscosities up to 600 poises, whereas the bubble-pressure method as used by Jaeger is limited to liquids of viscosity less than 70 poises. On the basis of internal evidence, the surface tension values obtained by the sessile-drop method are considered correct within 5%. They also agree with data by Jaeger, but are (roughly) twice as great as those of Washburn and Libman, who used a ring method. The probable sources of error in Washburn's work are discussed. The application of surface-energy data to the calculation of limiting strengths of glass in tension is discussed briefly.

11:45 A.M.–12:15 P.M.

7. The "Sessile" Drop Method: II, Study of the Nature of Glass-Metal Adherence at High Temperatures

By Bennett S. Ellefson and Nelson W. Taylor: Dept. of Ceramics, Pennsylvania State College, State College, Pa.

At 1000°C drops of sodium metasilicate resting on a gold surface showed the same contact angle with the metal surface, in air, oxygen, or *in vacuo*. $LiBO_3$, Na_2SiO_3, and enamel cover-coat frit spread on a platinum surface in air or oxygen but contracted to the original shape *in vacuo*. On carbon, the spreading was less than on gold or platinum *in vacuo*. Photographs illustrating these effects are shown, and a discussion is presented of the factors promoting adherence.

GLASS DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Le Perroquet Suite

Tuesday Afternoon, March 23, 1937: 2:00 P.M.–4:45 P.M.

2:00–2:20 P.M.

8. Simple Method for Comparing the Expansion of Glasses and Its Application to Casing Glasses

By J. E. Rosenberg and A. Langerman: O. Hommel Co., Pittsburgh, Pa.

The contraction of glasses between the "critical temperature" and room temperature is determined by firing the finely ground glass to an enameled steel cylindrical ring. The ring is cut at one diameter and the tensile force just necessary to part the ends of the ring is determined. This force is the function of the difference between the coefficients of expansion of the steel and the glass in the range between the "critical" and room temperature, as well as Young's modulus of the two materials. It is a simple matter to make determinations, and since the force measured depends on the differential between the expansions of steel and glass, relatively large differences in the forces are obtained for glasses having small differences in the expansion coefficients. It is found that these data can be used directly in determining the suitability of glasses for casing. Data are also given on the comparative expansions of commercial glasses.

2:20–2:45 P.M.

9. Undergraduate Thesis Work at the New York State College of Ceramics

By S. R. Scholes: Dept. of Glass Technology, New York State College of Ceramics, Alfred, N. Y.

This report consists of brief summaries of certain of the experimental studies undertaken as a partial requirement for the degree of Bachelor of Science in Glass Technology at the New York State College of Ceramics.

2:45–3:00 P.M.

10. Some Studies on Reactions between Glasses and Phosphate Solutions

By J. B. Brown: Dept. of Physiological Chemistry, Ohio State Univ., Columbus, Ohio
Arthur S. Watts: Dept. of Ceramics, Ohio State Univ.

A technique is described for determining the durability of glass exposed to phosphate solutions. Inactivation of solutions exposed to glass is reported on the basis of time and temperature. Inactivation is accompanied by solution (or peptization) of certain glass constituents, especially sodium, magnesium, and silicon. Small additions of sodium silicate and phosphate solutions cause inactivation. If water is heated with powdered glass, any phosphate solution in which it is used will be inactive. One explanation for these phenomena is suggested.

3:00–3:30 P.M.

11. X-Ray Diffraction Studies of Silica and Soda-Silica Glass

By B. E. Warren and J. Biscoe: Dept. of Physics, Massachusetts Institute of Technology, Cambridge, Mass.

A Fourier analysis has been made of the X-ray scattering patterns of two soda-silica glasses (26.9% and 33.9% Na_2O). The interpretation of the resulting distribution curves is discussed. X-ray scattering patterns of vitreous silica and low cristobalite have been made under comparable conditions with monochromatic X-rays and evacuated camera. If one wishes to assume that the scattering pattern of vitreous silica is due to small cristobalite crystallites, an average size of about 8A can be calculated from the patterns. The unit cell of cristobalite has dimensions of the order 7.0A. The bearing of this fact upon the question of whether vitreous silica can be considered to be cristobalite crystallites is discussed in detail.

3:30–3:45 P.M.

12. Some Observations on the Relation between Composition and Specific Refractivity of Glass

By A. N. Finn: National Bureau of Standards, Washington, D. C.

Available data on the density and refractivity of a large number of glasses of different composition have been

studied, and efforts have been made to correlate their specific refractivities and composition. The ionic radii of the constituent oxides of a glass, as reported (chiefly) by Pauling, apparently offer a satisfactory approach to a simple statement of the relation between specific refractivity and composition.

3:45–4:15 P.M.

13. Diffusion of Helium and Hydrogen through Pyrex-Chemically Resistant Glass

By Nelson W. Taylor, W. L. Rast, and Paul L. Smith: Dept. of Ceramics, Pennsylvania State College, State College, Pa.

The rates of diffusion of helium gas through Pyrex-brand glass in the temperature range 200° to 600°C have been measured. Glass under strain (unannealed) shows a lower rate of diffusion for He than does the annealed glass, although the strained glass has a lower density. Between 450° and 600°C, the diffusion rate may be expressed by the relation, $\log R = A - B/T$, the heat of activation being 7150 calories per mol. The straight line representing these data shows no break at the so-called transformation point of the glass as determined by expansion measurements, 550 ± 10°, and it is believed that this point has no unique significance as to glass structure or constitution. Below 450°C, the diffusion rate is expressed by a similar equation when the heat of activation for this range is 6400 calories per mol. At a temperature of 452 ± 2°, the glass undergoes an apparent structural change. The probable meaning of this is discussed. The effect of annealing for one month or longer at temperatures near 400°C is to increase the rate of helium diffusion, due probably to the reduction of stray electrical fields of the ions in the glass by ionic rearrangement. The relation between gas pressure and diffusion rate has been carefully investigated at four temperatures for helium and at two temperatures for hydrogen. In all cases, the rate is directly proportional to the gas pressure. The hydrogen appears to diffuse as molecules rather than as atoms or ions. It is believed that the mechanism of diffusion is essentially chemical rather than "crack diffusion" or effusion in the ordinary sense. From the standpoint of problems of glass structure, gas diffusion appears to offer considerable promise as a method of investigation.

4:15–4:45 P.M.

14. Physical Characteristics and Properties of Textile Material Made from Glass

By Games Slayter: Research and Development Div., Owens-Illinois Glass Co., Toledo, Ohio

Depending upon the application for which the material is made, glass textile material can be dull or lustrous, light as cotton or heavy as canvas, white or tinted. It is expected to have many industrial uses and now is being used as a filtering medium under severe conditions of acidity and temperature, as well as serving as a dielectric material in wire coatings, unimpregnated and impregnated tapes. Here the properties inherent in glass of chemical stability, heat resistance, and high dielectric strength are of great importance. For specific conditions, changes in glass composition are made to give suitable products.

GLASS DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Le Perroquet Suite

Wednesday Forenoon, March 24, 1937: 9:30 A.M.–12:00 M.

9:30–9:55 A.M.

15. An Attempt to Correlate Some Tensile Strength Measurements of Glass

By James Bailey and A. K. Lyle: Bailey & Sharp Co., Inc., Hamburg, N. Y.

Some data collected from various sources are analyzed and it is shown that the consideration of several fundamental factors will explain the great divergence in the results found for the tensile strength of glass.

9:55–10:15 A.M.

16. Effect of Annealing on the Expansivity of Some Glasses

By J. B. Saunders and A. Q. Tool: National Bureau of Standards, Washington, D. C.

Tentative results have been obtained which show to what degree the expansivities of several glasses are affected by changing the annealing temperature. For example, a change of 100°C in this temperature caused a change of about 0.26×10^{-6} in the expansivity of some of the glasses tested. The expansivities of these glasses as received were approximately 6.0×10^{-6}. Some intermediate annealing temperature always restored the expansivity to the original value.

10:15–11:00 A.M.

17. Theory of Photoelasticity

By Hans Mueller: Dept. of Physics, Massachusetts Institute of Technology, Cambridge, Mass.

A study of the photoelastic constants of glasses of various compositions and of cubic crystals reveals that the photoelastic birefringence is caused by two effects. Under the influence of a compression, the distribution and arrangement of the atoms are changed. This first effect gives rise to positive birefringence. It increases with increasing index of refraction. The second effect is a slight deformation of the atoms due to pressure. This deformation alters the optical properties of the atoms and produces negative birefringence. The magnitude of the second effect varies little with the composition of the glass. For glasses with a small index of refraction, the second effect predominates. Hence, pressure produces negative birefringence in most glasses and crystals. In the heaviest flint glasses and in some crystals, however,

the first effect is larger. Hence, they show a positive photoelastic constant. In some special glasses with an index of refraction of about 1.8, the two effects compensate each other, and no photoelastic effect is observed.

11:00–11:30 A.M.

18. Strength of Glassware and the Validity of the Gaussian Curve

By Frank W. Preston: Butler, Pa.

The variations in the strength of glass specimens, nominally alike, are very great. The "normal curve of errors" (e^{-s^2} type) is usually assumed to be applicable to the case, and results are commonly based on that assumption. Theoretically, the curve can not be applicable, and the question of how near to the truth it may be must be determined experimentally. As the subject has important practical and legal aspects, it has been investigated for some important cases.

11:30 A.M.–12:00 M.

19. Some Comments on the Constitution of Glass

By W. Weyl: Dept. of Ceramics, Pennsylvania State College, State College, Pa.

Evidence is presented in support of a classification of vitreous materials into three groups: silicate-glasses, organic glasses, and organic condensation products. The factors leading to high viscosity and long relaxation time are discussed in connection with stabilized and non-stabilized glasses and anomalies in the softening interval. The influence of temperature, heat treatment, and mineralizing agents on dissociation-association equilibria in glass is described. The applications of the present concept of glass to color, gas content, and fiber stability in glass are briefly outlined.

GLASS DIVISION LUNCHEON

Wednesday Noon, March 24, 1937: 12:15 P.M.–1:45 P.M.

Alexander Silverman will entertain the gathering with some colored motion pictures taken during the meetings of the International Union of Chemistry in Switzerland, August 16–22, 1936, and of the Glass Division in Cambridge Springs, Pa., October, 23–24, 1936. The Swiss pictures are not only full of beautiful scenery but contain portraits of many of Europe's notable chemists.

GLASS DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Le Perroquet Suite

Wednesday Afternoon, March 24, 1937: 2:00 P.M.–5:00 P.M.

This session will be devoted to the presentation and discussion of general and specific papers and reports on the physical properties of glass and the work the Glass Division is doing in cooperation with other technical societies.

2:00–2:40 P.M.

20. The Work of the Glass Division and Its Relation to the Needs of:

(a) The Illuminating Engineering Society

By H. H. Blau: Corning Glass Works, Macbeth-Evans Div., Charleroi, Pa.

(b) The Society of Heating and Ventilating Engineers

By R. A. Miller: Pittsburgh Plate Glass Co., Pittsburgh, Pa.

(c) The American Society for Testing Materials

By W. C. Taylor: Research and Development Dept., Corning Glass Works, Corning, N. Y.

2:40–3:00 P.M.

21. Cows and Cracks, or Measurements of the Strength of Glassware: Their Difficulties and Meaning

By Frank W. Preston: Butler, Pa.

3:00–3:30 P.M.

22. What Hardness Is, or What Hardness Is Not

By L. B. Tuckerman: National Bureau of Standards, Washington, D. C.

3:30–3:50 P.M.

23. Notes and Suggestions on Tests for Thermal Endurance of Glass

By James Bailey: Bailey & Sharp Co., Inc., Hamburg, N. Y.

3:50–4:10 P.M.

24. The Results of Some Recent Tests Relating to Thermal Endurance of Glass

By S. R. Scholes: Dept. of Glass Technology, New York State College of Ceramics, Alfred, N. Y.

4:10–4:30 P.M.

25. Report of Glass Section of Subcommittee V of Committee D-9, American Society for Testing Materials

By J. T. Littleton: Research and Development Department, Corning Glass Works, Corning, N. Y.

4:30–5:00 P.M.

26. Results of Tensile Strength Tests Obtained by the Glass Division's Committee

By C. J. Phillips: Research and Development Department, Corning Glass Works, Corning N. Y.

MATERIALS AND EQUIPMENT DIVISION PROGRAM

Chairman: H. B. DuBois, Consolidated Feldspar Corp., East Liverpool, Ohio
Secretary: G. F. Metz, Hardinge Co., Inc., York, Pa.
Program Chairman: V. V. Kelsey, Consolidated Feldspar Corp., Trenton, N. J.

Waldorf-Astoria Hotel: Basildon Room

Tuesday Forenoon, March 23, 1937: 9:30 A.M.–12:00 M.

9:30–10:00 A.M.

1. Preparation of Colloidal Mineral Colors

By Pierce M. Travis: Travis Colloid Research Co., Inc., 11 West 42nd St., New York, N. Y.

The preparation of mineral colors of fine particle sizes is discussed giving a new method of super-grinding by use of compressed air. A method of measuring the percentage of fines and superfines is described and will be illustrated by lantern slides. The subject is presented from the colloidal viewpoint.

10:00–10:30 A.M.

2. Patents and Ceramics

By Fulton B. Flick: Brown, Critchlow & Flick, 1706 First National Bldg., Pittsburgh, Pa.

This paper is directed chiefly to a discussion of the principles which govern the patentability of inventions in the United States. The various factors, such as invention, novelty, and utility are illustrated by examples directly relating to ceramic problems or by reference to court decisions involving patents in the ceramic field. The paper includes a brief historical discussion of patent systems with facts bearing on the standing of ceramics therein.

10:30–11:00 A.M.

3. Colloidal Graphite and Its Role in the Ceramic Industry

By Raymond Szymanowitz and Bernard H. Porter: Acheson Colloids Corp., 444 Madison Ave., New York, N. Y.

In tracing the development of colloidal graphite from the early work of E. G. Acheson on the plasticity of clays to the present use of graphited lubricants in the ceramic industry, the authors review the historical data of general interest, describe the physical properties of colloidal graphite suspensions, relate these characteristics to glassworking techniques, and cite practical tests showing the advantages to be accrued from this type of adjunct lubricant.

11:00–11:30 A.M.

4. Bentonite, Its Technology and Industrial Uses

By Paul Bechtner: American Colloid Co., 363 W. Superior St., Chicago, Ill.

The paper discusses the problem of correlating the distinctive properties of bentonite to ceramic use.

MATERIALS AND EQUIPMENT DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Basildon Room

Tuesday Afternoon, March 23, 1937: 2:00 P.M.–5:00 P.M.

2:00–2:30 P.M.

5. Preparation of Ball Clays

By Richard B. Carothers: H. C. Spinks Clay Co., Newport, Ky.

The discovery, sampling, and testing of a ball-clay deposit is presented, and its development and working are described. The "impurities" and the efforts to reduce them as well as the moisture control of the clay are presented. The question of the desirability and economy of cleaning the clays at the clay mines rather than by the clay user is raised.

2:30–3:00 P.M.

6. A New Process North Carolina Kaolin Refinery

By J. R. Grout, Jr.: Harris Clay Co., Spruce Pine, N. C.

A short historical sketch prefaces a description and flow sheet. Detailed remarks are given on the method of control used. A comparison is made of some properties of the kaolin produced by the old and new process. An estimate of the clay reserves for the refinery is reported.

3:00–3:30 P.M.

7. Lithium Minerals and Compounds in Ceramics

By George C. Betz: Foote Mineral Co., Philadelphia, Pa.

A comparison of the chemical and physical properties of lithium and the more common alkali metals, sodium and potassium, is presented. The occurrence and chemical analyses of the commercial ores of lithium and the ceramic application of some of the lithium compounds are given.

3:30–4:00 P.M.

8(a). Analysis of Feldspar, Determination of Ferric Oxide: I, Decomposition of Sample

By E. W. Koenig: Consolidated Feldspar Corp., Erwin, Tenn.

A modified method for the decomposition of the feldspar sample preliminary to the determination of percentage ferric oxide is described.

8(b). Analysis of Feldspar, Determination of Ferric Oxide: II, Application of Titanometry

By E. W. Koenig

The application of the titanometric methods of analysis to the estimation of trivalent iron in feldspar is advocated

MATERIALS AND EQUIPMENT DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Basildon Room

Wednesday Forenoon, March 24, 1937: 9:30 A.M.–12:00 M.

9:30–10:00 A.M.

9. Grinding Ceramic Materials in Ball, Pebble, Rod, and Tube Mills

By G. F. Metz: Hardinge Company, Inc., York, Pa.

Cylindrical and conical ball and pebble mills and tube and rod mills are described as well as the principle of open-*vs.* closed-circuit grinding. A list of typical grinding problems covering a number of ceramic materials and the solution of these problems are given in detail. The actual ceramic milling installations on a variety of materials are shown.

10:00–10:30 A.M.

10. Some Special Wear-Resisting Metals for Clay Machinery Use

By J. O. Everhart: Engineering Experiment Station, Ohio State University, Columbus, Ohio

For more than two years the Ohio State University Engineering Experiment Station has been making a study of wear-resisting materials for clay machinery parts. More than 50 alloy irons and steels have been subjected to actual plant tests, *e.g.*, mill knives, die liners, muller tires, and grinder parts. The best of these are discussed from the standpoint of economy and service. Recommendations as to the proper kind of material for various types of installations are given.

10:30–11:00 A.M.

11. Glass Sand Industry in Pennsylvania in 1936

By R. W. Stone: Pennsylvania Topographic and Geologic Survey, Harrisburg, Pa.

In 1932–34 the average value of Pennsylvania glass sand was $1.89 per ton as against $1.83 for West Virginia and $1.00 for Illinois sand. In 1935, the value of Illinois sand went up to $1.18 and of Pennsylvania sand down to $1.70.

Glass sand is produced in Pennsylvania from the Oriskany sandstone, which was laid down in a shallow Lower Devonian sea about 380 million years ago, and from the Pottsville sandstone of lower Pennsylvanian age laid down on land about 300 million years ago by rivers from a now extinct continent to the east. The origin of these sandstones is another story. From that small beginning the industry has grown until in 1929 the value of glass sand alone produced in this State exceeded one million dollars. In the last three years, it has approached three-quarters of a million. Glass sand is produced by quarrying the friable sand rock, crushing, screening, washing, and drying. At one place, the rock is mined underground. Typical analyses of the sand as marketed show 99.35 to 99.82% silica.

11:00–11:30 A.M.

12. The Porters Creek Clay of West Tennessee and Its Light-Weight Product Possibilities

By George I. Whitlatch: Tennessee Division of Geology, Nashville, Tenn.

The Porters Creek clay, an abundant and accessible but undeveloped clay, fires naturally to exceptionally low densities. Data on 19 localities show that between cones 1 and 12 the apparent specific gravity ranges from 1.29 to 1.58, and the apparent porosity, to which the levity is due, averages 40%. Good quality common brick with 25% less weight than ordinary clay brick and crushing strength of more than 2000 pounds per square inch have been made in plant tests. Test pieces of the clay, fired to cone 1, have successfully withstood 18 cycles of freezing and thawing. Refractoriness is too low for high-temperature insulation, but the commercial tests indicate possible adaption of the clay to "back-up" insulators. An introductory summary of the current status of the lightweight products industry in the United States is given.

11:30 A.M.–12:00 M.

13. Nepheline Syenite

By Raymond B. Ladoo: Canadian Nepheline Ltd., Toronto, Canada.

Nepheline syenite is an igneous rock free from quartz but containing potash feldspar. The only commercial source is Blue Mountain, Canada. The rock and its mining, milling, and ceramic uses are described.

REFRACTORIES DIVISION PROGRAM

Chairman: R. E. Birch, Harbison-Walker Refractories Co., Pittsburgh, Pa.
Secretary: N. W. Taylor, Pennsylvania State College, State College, Pa.
Program Committee: *Chairman*, S. F. Walton, Exolon Co., Blasdell, N. Y.
W. C. Rueckel, Koppers Co., Pittsburgh, Pa.
W. R. Kerr, Armstrong Cork Co., Beaver Falls, Pa.
J. D. Sullivan, Battelle Memorial Institute, Columbus, Ohio

Waldorf-Astoria Hotel: Jade Room

Tuesday Forenoon, March 23, 1937: 9:30 A.M.–12:00 M.

9:30–9:45 A.M.

1. Introduction

By R. E. Birch, *Chairman*

Symposium on "Refractories Testing"

9:45–10:10 A.M.

2. The Work of the A.S.T.M. on Refractories

By C. E. Bales: Ironton Fire Brick Co., Ironton, Ohio

A discussion is presented of the organization and operation of Committee C-8 on Refractories of the American Society of Testing Materials, how test methods are formulated, and how they are finally adopted as standard methods.

10:10–10:35 A.M.

3. What Makes the Testing of Refractories Difficult

By S. M. Phelps: Mellon Institute, Pittsburgh, Pa.

An outline of the problems encountered in the design of test methods for refractories involved in the nonreproductibility of present test methods is presented.

10:35–11:00 A.M.

4. Methods of Testing Refractory Insulation

By W. C. Rueckel: Engineering and Construction Div., Koppers Co., Pittsburgh, Pa.

A résumé of methods used for determining the physical properties of insulating refractories is given. The utility rating of the various test methods and refinements in test procedure is also discussed.

11:00–11:30 A.M.

5. Panel Spalling Tests on Insulating Brick and Insulating Fire Brick

By W. Raymond Kerr: Armstrong Cork Co., Beaver Falls, Pa.

The procedure described includes a description of the test furnace used. The method of preparing test panels is given. Preheat periods of 24 hours at various predetermined temperatures were used in all tests. Spalling includes 10 cycles of heating and cooling with air at room temperature as the cooling medium at a volume of 1400 cu. ft. per minute. The preheat period is valuable as it shows whether or not the brick will stand the recommended temperature. Structural changes apt to occur in service are also brought out in the preheat period. Spalling resistance is believed to depend on a number of factors, including mechanical strength, nonvitrified structure, and absence of marked reducing conditions in use. The chemical constitution of the brick for any definite temperature is believed to be of less importance than some of the physical properties.

11:30 A.M.–12:00 M.

6. Practical Service Testing of Refractories in an Alloy Steel Plant

By E. E. Callinan and Gilbert Soler: Timken Steel and Tube Div., Timken Roller Bearing Co., Canton, Ohio

A discussion is presented of the relationship between the proper selection of refractories and the economics of the steel-plant operation and the steel quality. The practical utilization of laboratory and service tests is emphasized. Examples of the method of conducting service tests in open-hearth furnaces, electric furnaces, pouring pits, and in other furnaces are illustrated.

REFRACTORIES DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Jade Room

Tuesday Afternoon, March 23, 1937: 2:00 P.M.–5:00 P.M.

Symposium on "Refractories Testing" (continued)

2:00–2:25 P. M.

7. Navy Department Methods of Testing Refractory Linings for Naval Boilers

By F. M. McGeary: Engineer (Materials), Bureau of Engineering, Navy Dept., Washington, D. C.

Brief comments are made on the reason for special tests of refractory linings for Naval boilers. An outline is given of the service spalling test developed by the Refractories Fellowship, Mellon Institute, now Tentative A.S.T.M. Standard G–38-34T. A complete description of the Navy Department's adaptation of this test with illustrations and a discussion of its results are presented. Possible errors owing to instruments and personnel are shown. The results indicate that a test designed to cover this specialized service is a necessity to the Navy and might be desirable for all large users of refractories. The work factor method of evaluation is briefly outlined.

2:25–2:50 P.M.

8. Apparatus and Equipment Used for Studying the Properties of Refractory Materials at the National Bureau of Standards

By R. A. HEINDL: National Bureau of Standards, Washington, D. C.

2:50–3:00 P.M.

9. Closing of Symposium

By R. E. BIRCH, *Chairman*

3:00–3:30 P.M.

10. Comparison of the Thermal Conductivity and Thermal Expansion of Coke-Oven Liners Made from Eastern and Western Quartzite

By J. B. AUSTIN, R. H. H. PIERCE, JR., AND WALTER O. LUNDBERG: Research Laboratory, United States Steel Corp., Kearny, N. J.

The results of a set of comparative measurements carried out on "eastern" and "western" brick made by the same process show that the western brick is the better conductor by approximately 15%. This difference is quantitatively explained by the difference in porosity of the two kinds of brick. Only minor differences in thermal expansion were found.

3:30–4:00 P.M.

11. Furnace Spalling of Silica Brick during Heating and Cooling

By J. M. MCKINLEY: North American Refractories Co., Cleveland, Ohio

S. M. PHELPS: Mellon Institute, Pittsburgh, Pa.

The object of the work reported in this paper is to show the maximum rates at which silica brick can be heated or cooled without spalling of the brick in the furnaces. The tests used were designed to duplicate furnace conditions in the heating and cooling of walls, obtaining temperature gradients. The tests were conducted at 400, 600, and 800°C, using different rates of heating and cooling. A comparison is given showing the similarity of the results of the spalling in furnace roofs and the laboratory results.

4:00–4:30 P.M.

12. Ash Attack on Silica Brick

By W. C. RUECKEL: Koppers Construction Co., Pittsburgh, Pa.

4:30–5:00 P.M.

13. Acid Bessemer Refractories

By J. H. CHESTERS AND R. J. MCLEAN: United Steel Companies, Ltd., Sheffield, England. (Presented by FRED A. HARVEY: Harbison-Walker Refractories Company)

A study has been made of the refractories used in the acid Bessemer process. The failure of the tuyères, which generally precedes that of the remainder of the bottom, is found to be due mainly to the attack of ferrous oxide and manganous oxide. The rapid rate of wear is explained by the fact that an addition of only 8% of ferrous oxide or manganous oxide reduces the melting point of the tuyère to 1550°C, *i.e.*, to about the temperature of the molten steel. Laboratory investigations suggest a number of possible ways of increasing bottom life, *e.g.*, the production and use of (*a*) basic tuyères of high spalling resistance, (*b*) plumbago tuyères, and (*c*) fireclay tuyères of higher alumina content.

REFRACTORIES DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Jade Room

Wednesday Forenoon, March 24, 1937: 9:30 A.M.–12:00 M.

9:30–9:55 A.M.

14. Improved Apparatus for Measuring Conductivity of Refractories at High Temperatures

By J. L. FINCK, J. L. Finck Laboratories, New York, N. Y.

The improvements are described which have been made in the thermal conductivity apparatus.*

* J. L. Finck, "Apparatus for Measuring Thermal Conductivity of Refractories at High Temperatures," *Jour. Amer. Ceram. Soc.*, **18** [1] 6–12 (1935).

9:55–10:20 A.M.

15. Plastic Deformation of Fireclay Brick at 1220°C

By R. A. HEINDL: Chief, Refractories Section, National Bureau of Standards, Washington, D. C.

Data were obtained on the plastic deformation or flow, during a $1^1/_2$ hour period, of 17 commercial brands of fireclay brick held at 1220°C under a constant load. Data were obtained on specimens as received from the manufacturer and also after reheating at 1400° and 1500°C. The percentage recovery after the removal of the load was also determined.

10:20–10:45 A.M.

16. Effect of Boron Oxide, Phosphorous Pentoxide, and Ferric Oxide on the Thermal Expansion of a Florida Kaolin-Quartz Mixture

By C. L. Thompson and C. W. Parmelee: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

The effect of small additions of B_2O_3, P_2O_5 (as aluminum phosphate), and Fe_2O_3 to a body composed of 40% quartz and 60% Florida kaolin on the thermal expansion of the mixture, after single and repeated firings, was studied. The boron oxide gave marked reduction in the thermal expansion of the mixture after repeated firings, ranging up to cone 16, in that portion of the specimen from which it had not been volatilized. In all other cases, it had little effect. The iron oxide caused small but distinct reductions in the thermal expansion of the mixture. The effect of the phosphorous pentoxide was only slight.

10:45–11:10 A.M.

17. Effect of Sodium Aluminate in Bonding Super-Fireclay Brick

By J. M. McKinley: North American Refractories Co., Cleveland, Ohio

W. K. Carter: National Aluminate Corp., Chicago, Ill.

Notes and data reporting experimental work and progressive development, on a commercial scale, of the usage of sodium aluminate as a refractory bonding material are presented. A brief description of the chemical characteristics of sodium aluminate is also given.

11:10–11:35 A.M.

18. A Study of a Used Alumina-Silica Checker Brick from the Regenerator of a Glass Tank

By C. L. Thompson and E. P. Rexford: Hays Laboratory, Harbison-Walker Refractories Co., Pittsburgh, Pa.

The cause of slabbing or peeling of the surface of alumina-silica brick from the hottest section of the checker chamber of a glass tank was investigated. It was found that the alkali from the glass batch carried into the checkerwork by the gases had reacted with the mullite and corundum in the brick to form nephelite. The slabbing of the affected portion is attributed to the permanent expansion resulting from the formation of nephelite and to the differences in the reversible thermal expansion of the affected and unaffected parts of the brick.

11:35 A.M.–12:00 M.

19. Secondary Expansion in Refractory Clays

By J. O. Everhart: Engineering Experiment Station, Ohio State Univ., Columbus, Ohio

Secondary or after-expansion is evidenced by a considerable number of refractory clays. It is a considerable increase in volume, usually occurring in the range from cones 6 to 14. Data presented in this paper were secured in an investigation made by the Engineering Experiment Station on twenty-one representative clays from Missouri, Ohio, Kentucky, and Pennsylvania. The findings indicate that the expansion is caused by opening up of the natural lamination or bedding planes in the clay grains. Two methods for reducing or eliminating the expansion are given. Data concerning chemical analyses, petrographic examinations, and X-ray studies are presented.

REFRACTORIES DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Jade Room

Wednesday Afternoon, March 24, 1937: 2:00 P.M.–5:00 P.M.

2:00–2:30 P.M.

20. The Refractory and Ceramic Uses of Fused Silica

By W. W. Winship: Thermal Syndicate, Ltd., New York, N. Y.

Fused silica apparatus, on account of chemical inertness, low expansion, and certain other physical characteristics, occupies an important place for use outside the temperature possibilities of glass, stoneware, and porcelain. Vitreous silica in bulk, either by-product material or specially prepared, is a valuable ingredient in ceramic mixtures where severe temperature gradients are involved.

2:30–3:00 P.M.

21. Physical Properties of Silicon Carbide Refractories

By H. N. Baumann, Jr., and J. P. Swentzel: Carborundum Company, Niagara Falls, N. Y.

The physical properties and engineering data of silicon carbide refractories, particularly those of the bonded type containing at least 85% SiC, which is now recognized as a commercial standard, are compiled. The principal ceramic and metallurgical applications of these refractories are enumerated. The data presented in this paper are largely a compilation of previously published values but are here presented as far as possible in the form of graphs and tables.

3:00–3:30 P.M.

22. Composition and Properties of Fused Alumina Refractories

By Grant S. Diamond: Electro Refractories & Alloys Corp., Buffalo, N. Y.

Tests on fused alumina crystals, bond, and brick were made from these materials. Several grades of refractory fused alumina were used and one other abrasive-type alumina. Specifications on material include chemical and petrographic analyses, densities, grain shape, and capillarity. The process used in manufacture of the brick includes mixing, molding, drying, and firing. Tests on finished brick include density, hot and cold strength, permeability, hardness, and petrographic analyses.

3:30–4:00 P.M.

23. Electrically Fused Magnesia

By H. E. WHITE: Lava Crucible Company of Pittsburgh, Zelienople, Pa.

This paper discusses (1) the sources of supply and availability of raw materials; (2) the economical and practical advantages of the use of fused magnesia; (3) the character of the crystalline material obtained from fusing different types of raw materials; (4) physical characteristics and peculiarities of the crystalline material; and (5) various uses for the finished product.

4:00–4:30 P.M.

24. Some Considerations in the Process of Producing Fused Mullite for Refractories

By HOBART M. KRANER: Bethlehem Steel Co., Bethlehem, Pa.

The principles of the process of fusing ceramic materials for abrasives and refractories are now rather generally known. The benefits to be derived from the additions of fused materials to a refractory are likely to be (1) an increase of chemical resistance due to the greater density and lower permeability, (2) an increase of the product's load-bearing value, and (3) a control of the kind and number of crystalline materials present in the grain as well as the proportion of glass contained. The term "flux" is not necessarily correctly used in connection with such fused materials, as it often applies only to a constituent which changes the proportions of the crystalline phases and does not affect the refractoriness or glass content.

4:30–5:00 P.M.

25. Evidences of Variation in the Structure of Mullite

By HELEN BLAIR BARLETT: A C Spark Plug Div., General Motors Corp., Flint, Mich.

Evidence obtained from X-ray diffraction data is presented to show that the structure of mullite is dependent upon the composition from which it has crystallized, on the high-silica side of its theoretical composition as well as on the low-silica side.

STRUCTURAL CLAY PRODUCTS AND TERRA COTTA DIVISIONS

JOINT PROGRAMS

Structural Clay Products Division Officers

Chairman: J. W. Whittemore, Virginia Polytechnic Institute, Blacksburg, Va.
Secretary: E. C. Clemens, Cannelton Sewer Pipe Co., Cannelton, Ind.
Program Chairman: T. W. Garve, 235 West Tenth Ave., Columbus, Ohio

Terra Cotta Division Officers

Chairman: H. E. Davis, Federal Seaboard Terra Cotta Co., South Amboy, N. J.
Secretary: D. F. Albery, American Terra Cotta Corp., Crystal Lake, Ill.
Program Committee: *Chairman,* H. E. Davis
R. L. Clare, Federal Seaboard Terra Cotta Co., South Amboy, N. J.

Waldorf-Astoria Hotel: Jansen Suite

Tuesday Forenoon, March 23, 1937: 9:30 A.M.–12:00 M.

9:30–9:50 A.M.

1. An Architect Looks at Clay

By Theodore Irving Coe: American Institute of Architects, Washington, D. C.

The history and development, architecturally, of clay products with particular reference to present-day trends in construction are given, and the possibilities for the future in the further development of clay products to meet economic and structural conditions and changing construction techniques are suggested.

9:50–10:10 A.M.

2. Laboratory, Factory, and Market

By Jordan A. Pugh: Structural Clay Products, Inc., 1427 Eye St., N.W., Washington, D. C.

A discussion is presented of the relation between laboratory, factory, and market.

10:10–10:30 A.M.

3. Rate of Absorption of Building Brick

By J. W. McBurney: National Bureau of Standards, Washington, D. C.

Comparisons are made of the results of water absorption determined by total immersion with the rates of absorption determined at one- and three-minute intervals, as well as with rates of absorption measured by the time required to absorb completely one milliliter of water. The applications of certain rate-of-absorption specifications are discussed.

10:30–10:50 A.M.

4. Abrasive Action of Sewage on Brick Sewers

By Harry C. Plummer: Brick Manufacturer's Association of America, Cleveland, Ohio

10:50–11:10 A.M.

5. Necessity of the Specification of Test Conditions in the Determination of Young's Modulus of Elasticity

By W. R. Morgan: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

Young's modulus of elasticity is shown to decrease with increasing test load as the vitrification of the clay body increases, indicating the nonhomogeneous character of the specimen and formation of a surface skin. Comparisons of bodies therefore should be made under specified test conditions.

11:10–11:30 A.M.

6. Discussion of the Properties of Mortar for Use for Unit Masonry Construction

By Lee S. Trainor: National Lime Association, Washington, D. C.

A discussion is presented of research work on mortars and masonry as reported in recent years and recent developments which have not yet been officially reported.

11:30–11:50 A.M.

7. "Vittrazzo"

By D. C. Asper and John J. Reimer: The Penn Tile Works Co., Aspers, Pa.

A vitreous clay ceramic aggregate known as "Vittrazzo" has been developed for use in cast stone and terrazzo work. This manufactured granule does not limit the range of colors as do the natural aggregates because it can be secured in all the brilliant ceramic colors.

STRUCTURAL CLAY PRODUCTS AND TERRA COTTA DIVISIONS

JOINT PROGRAMS (continued)

Waldorf-Astoria Hotel: Jansen Suite

Tuesday Afternoon, March 23, 1937: 2:00 P.M.–5:00 P.M.

2:00–2:30 P.M.

8. Ability of Some Underslips and Glazes to Cover Surface Cavities

By J. F. McMahon: N. Y. State College of Ceramics, Alfred, N. Y.

The ability of engobes and glazes to fill and cover surface imperfections such as cracks and cavities was studied. It was found that this property of the engobes and glazes could be improved by using certain compositions. The ball clays used in the underslip and glaze are especially important since some ball clays were found to have twice the covering ability of others.

2:30–3:00 P.M.

9. Effect of Liquids on the Packing of Particles

By W. R. Morgan and C. W. Parmelee: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

Experimental data on the effect of liquids on the packing of particles and on the shrinkage and strength of clays are given.

3:00–3:30 P.M.

10. Study of the Internal Structure of Brick—Progress Report

By H. Z. Schofield: Engineering Experiment Station, Ohio State Univ., Columbus, Ohio

A means was developed by which brick were cut and the interior structure exposed. Illustrations are given of some structures found. Brick were manufactured with ten different combinations of augers, dies, and spacer lengths. Illustrations of interior structures and also results of physical tests on brick made under the above ten conditions are given.

3:30–4:00 P.M.

11. Effect of Weathering on the Physical Properties of a Fired Clay Body

By W. R. Morgan: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

Specimens of a clay body fired over a wide range of temperature were subjected to artificial weathering which consisted of repeated wetting and drying at 100°F for a total of 200 cycles. The effects of the treatment on modulus of rupture, modulus of elasticity, expansion, and permanent gain in weight were determined at intervals during the test.

4:00–4:30 P.M.

12. Efflorescence of Building Brick

By J. W. McBurney: National Bureau of Standards, Washington, D. C.

Correlation between results of the 5-day wick test on individual brick and the appearance of efflorescence on the exposed masonry panels is discussed. A summary of the results of testing the products of 255 manufacturers by the 5-day wick test is given.

4:30–5:00 P.M.

13. Colors for Sand-Mold Brick

By Frank E. Lobaugh: N. Y. State College of Ceramics, Alfred, N. Y.

Various colors of soft-mud brick produced by mixing coloring agents in the molding sand are studied. Sand and clay of the Hudson River District of New York were used and the test pieces were fired under oxidizing conditions.

STRUCTURAL CLAY PRODUCTS AND TERRA COTTA DIVISIONS

JOINT PROGRAM (continued)

Waldorf-Astoria Hotel: Jansen Suite

Wednesday Forenoon, March 24, 1937: 9:00 A.M.–12:00 M.

9:30–9:50 A.M.

14. Common De-Airing Problems and Their Solution

By John H. Isenhour: G. W. Isenhour & Sons, Salisbury, N. C.

Shrinkage and drying troubles are common problems with many de-airing installations. This paper discusses these problems and their possible solution.

9:50–10:10 A.M.

15. Die Face Lengths and Pitches

By H. R. Straight: Straight Engineering Co., Adel, Iowa

A discussion is given of the effect of pressure on clay in the plastic condition under pressure as flowing through dies of various lengths.

10:10–10:30 A.M.

16. Method Employed in Firing Chicago Surface Clays

By Hugo Filippi: Illinois Brick Co., Chicago, Ill.

A discussion is presented of the geological classification of local surface clay with typical chemical analyses and a description of the methods employed in machining, drying, and setting ware. Typical firing equipment, type of fuel oil, atomizing and oil pressures employed, and the general technique of firing are discussed. Typical time-temperature curves are shown and a heat balance for the type of updraft kiln employed is presented. (Illustrated by 2 tables, 3 line drawings, and 11 colored lantern slides.)

10:30–10:50 A.M.

17. Use of Stokers on Ceramic Kilns

By John H. Isenhour: G. W. Isenhour & Sons, Salisbury, N. C.

This paper deals with the adaptability, labor saving, fuel saving, and other advantages of stoker firing on round downdraft kilns and various other types.

10:50–11:10 A.M.

18. A Simple High-Temperature Gas Burner

By John J. Reimer and T. W. Drummond: The Penn Tile Works Co., Aspers, Pa.

A gas burner which was made from an obsolete vacuum cleaner and pipe fittings was attached to a laboratory experimental kiln. This burner reaches cone 12 in thirty minutes and has proved to be very efficient.

11:10–11:30 A.M.

19. Construction and Operation of a Simple Pyrometer System

By Eugene C. Clemens: Cannelton Sewer Pipe Co., Cannelton, Ind.

For use with kilns firing sewer pipe, a pyrometer system must be rugged, simple, accurate, and resistant to corrosive gases. Low initial cost and economy of operation are desirable. Using a conventional wiring circuit, a base metal system was constructed having these features and was made of stock materials with the exception of three parts. Operating as high as cone 6, this system showed greater accuracy and lower cost than a noble metal system. Repairs are easily made. Wiring circuit, construction details, and operating life are given.

11:30–11:50 A.M.

20. Stability of a Kiln Stack

By T. W. Garve: 235 West Tenth Ave., Columbus, Ohio

Mathematical proof is presented that the wind pressure on a round stack is two-thirds that of a square stack. A reconsideration is given of a stack section from a previous paper,* where tension occurred and a correction is presented. A convenient method (with application) for calculating the stability of a kiln stack upon the soil is explained as well as the application of "Kern" theorem.

* T. W. Garve, "Stability and Design of Kiln Stack," *Jour. Amer. Ceram. Soc.*, **5** [7] 455–67 (1922).

STRUCTURAL CLAY PRODUCTS AND TERRA COTTA DIVISIONS

JOINT PROGRAM (continued)

Waldorf-Astoria Hotel: Jansen Suite

Wednesday Afternoon, March 24, 1937: 2:00 P.M.–5:00 P.M.

2:00–2:25 P.M.

21. Drier Recirculation

By H. R. Straight: Straight Engineering Co., Adel, Iowa

A method of recirculation has been used successfully in a radiated heat drier in which the humidity and temperature are automatically controlled. In this drier all source of heat is from kilns being fired and cooled. No auxiliary heat has been found necessary.

2:25–2:50 P.M.

22. Effect of Various Treatments of Clay on Rate of Drying

By F. W. Bull and J. W. Whittemore: Dept. of Ceramics, Virginia Polytechnic Inst., Blacksburg, Va.

This paper includes a laboratory study of the effect of de-airing and the addition of flocculents on the rate of drying of various clays.

2:50–3:15 P.M.

23. Drying Characteristics of a Calcareous Surface Clay

By R. K. Hursh and C. R. Filippi: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

The drying behavior of two samples of calcareous surface clay was observed under varied conditions of temperature and relative humidity. The results of drying tests on stiff-mud, side-cut and end-cut brick are given.

3:15–3:40 P.M.

24. Some Drying Properties of Clays: I, Drying Shrinkage of Clays When Dried under Low Pressure

By H. G. Schurecht and C. M. Lampman: N. Y. State College of Ceramics, Alfred, N. Y.

Low pressures on clays during drying were found to change the shape of clays to a marked extent thus causing oversize ware. Inasmuch as such changes in shape usually produce strains in the body, they too frequently cause drying and firing cracks and other structural imperfections. Some clays are more resistant to these deformations than others. A study of the shrinkage of six different clays when dried under low pressures showed marked differences, depending upon the plasticity and bonded powers of the clays. The rate of drying per unit decrease in water content was governed largely by imposed loads and tensile strength of clay during drying.

3:40–4:05 P.M.

25. Some Drying Properties of Clays: II, Effect of Small Imposed Loads on the Rate of Drying of Some Clays

By H. G. Schurecht and C. M. Lampman

Small pressures commonly present in ware stacked during drying and in the lower positions of large pieces were found to accelerate the rate of drying of certain clays. With one clay, the rate of drying was almost doubled by an imposed load of 1.56 pounds per square inch during drying. Clays of low plasticity are influenced more by such loads than those of high plasticity.

4:05–4:30 P.M.

26. Some Drying Properties of Clays: III, Influence of Drying Pallets on the Drying Shrinkage of Clays When Dried under Small Pressures

By H. G. Schurecht and C. M. Lampman

The surfaces and pallets on which clays are dried were found to deform and crack clays in different degrees during drying under imposed loads. This was especially important for clays of low plasticity and bonding power, inasmuch as certain drying pallets and surfaces caused excessive deformation and cracking of such clays. Wooden drying pallets cause less harm to the clay than steel or glass pallets. Covering their surface with sand or cardboard greatly reduces this trouble while grease makes it worse.

4:30–4:55 P.M.

27. Results of the Use of Plasticized Sulfur as a Jointing Material for Clay Products

By W. W. Duecker: Mellon Institute, Pittsburgh, Pa.
H. Z. Schofield: Engineering Experiment Station, Ohio State Univ., Columbus, Ohio

Previously[1] the development of a series of sulfur compounds possessing plastic properties was described. Two types of plasticized sulfur were subsequently used in the construction of an experimental brick road. The results attending the application of these two types of plasticized sulfur are described. A description is also given of the appearance of these compounds after more than a year's service. Data are included on the adhesion of sulfur compounds to clay products.

[1] W. C. Rueckel and W. W. Duecker, "Plasticized Sulfer as a Jointing Material for Clay Products," *Bull. Amer. Ceram. Soc.*, **14** [10] 329–32 (1935).

Additional Title

28. Effect of Different Bodies on Some Properties of Glazes in the Liquid State

By C. Major Lampman: N. Y. State College of Ceramics, Alfred, N. Y.

WHITE WARES DIVISION PROGRAM

Chairman: S. J. McDowell, General Ceramics Co., Keasbey, N. J.
Secretary: R. F. Geller, National Bureau of Standards, Washington, D. C.
Program Committee: *Chairman,* Karl Schwartzwalder, A C Spark Plug Co., Flint, Mich.
G. C. Betz, Foote Mineral Co., Philadelphia, Pa.
J. W. Hepplewhite, Edwin M. Knowles China Co., East Liverpool, Ohio

Waldorf-Astoria Hotel: Astor Gallery

Tuesday Forenoon, March 23, 1937: 9:30 A.M.–12:00 M.

9:30–10:00 A.M.

1. Physical Basis of Color Specification

By A. C. Hardy: Massachusetts Institute of Technology. Cambridge, Mass.

Despite the age and extent of man's interest in color, the development of adequate methods of color measurement and specification has taken place only recently. With the construction of suitable optical instruments and the international agreement in 1931 concerning the characteristics of the normal human eye, it is now possible to specify color in terms that will be intelligible even to succeeding generations. This paper outlines the methods that are being currently employed to an increasing extent and attempts to indicate the value of such methods in the solution of routine production problems.

10:00–10:30 A.M.

2. High-Temperature Measurements

By H. T. Wensel: Chief, Pyrometry Section, National Bureau of Standards, Washington, D. C.

A general discussion of the subject of high-temperature measurements, the methods and instruments available, and the accuracy usually attained is presented. The methods best suited to particular conditions are given.

10:30–11:00 A.M.

3. PbO–B_2O_3–SiO_2 Glazes and Crystalline Phases

By R. F. Geller, E. N. Bunting, and A. S. Creamer: National Bureau of Standards

A preliminary report is given on some compositions as glasses in the binary system PbO–B_2O_3, and the ternary system PbO–B_2O_3–SiO_2, with special emphasis on their possibilities as glazes, and also a partial presentation of phase equilibria in the system PbO–B_2O_3.

11:00–11:30 A.M.

4. Calculation of Heat Treatment of Whiteware Bodies

By W. W. Meyer: National Bureau of Standards

From data of other investigations, the constant in Arrhenius' equation has been calculated. Proceeding from this point, a mathematical expression for the amount of reaction taking place in a normal whiteware mixture, when heated according to a given schedule, has been obtained. Formulas have been developed for determining the heat treatment, including the rate of temperature rise and the soaking period (both of which may be varied), of a normal white body of known RO content.

11:30 A.M.–12:00 M.

5. Effect of Heating Rate on the Glassy Phase and Other Physical Properties of Whiteware Bodies

By W. W. Meyer and G. R. Shelton: National Bureau of Standards

Vitreous and semivitreous whiteware bodies were heated at various rates of temperature rise. The specimens were examined microscopically in an endeavor to correlate differences in the glass phase present with the physical properties of the bodies. Photomicrographs show the differences in structure and also in the glass produced by fast and slow heating to the same degree of vitrification in one case and to a given temperature in another. The effect of soaking these bodies at the final temperature was also determined.

WHITE WARES DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Astor Gallery

Tuesday Afternoon, March 23, 1937: 2:00 P.M.–4:30 P.M.

2:00–2:30 P.M.

6. Continuous vs. Periodic Filtering

By G. G. Kent and E. M. Rupp: Square D Co., Peru, Ind.

Some of the problems encountered in continuous filtering and how they were solved at one plant manufacturing dry-pressed porcelain and using a body consisting of 40% plastic material are presented. A comparison of costs of the two systems is also given.

2:30–3:00 P.M.

7. Development of a Commercial Miniature Rapid-Fire Tunnel Kiln

By T. G. McDougal: A C Spark Plug Div., General Motors Corp., Flint, Mich.

Considerations involved in the design and operation of rapid-fire tunnel kilns are discussed. Commercial success is reported and one such kiln, operated at 1780°C to mature spark-plug insulators on a two-hour firing cycle, is described. With such short firing cycles proved practicable as applied to commercial quantity production and with economical kiln operation at higher temperatures an accomplished fact, it is suggested that study in the field of ceramic compositions is well worth extending.

3:00–3:30 P.M.

8. Steatite Bodies, Vitrified Low Coefficient of Expansion Bodies, and High Dielectric Constant Materials

By Hans Thurnauer: Development Engineer, American Lava Corp., Chattanooga, Tenn.

Requirements of physical properties for high-frequency insulators are outlined. Most of these properties, especially low dielectric loss at high frequencies, are found in steatite bodies, whose properties are presented in relation to their chemical composition. New developments of ceramic materials having a high dielectric constant are discussed.

3:30–4:00 P.M.

9. Water and Its Relation to Ceramic Processes

By J. R. Beam: Universal Sanitary Mfg. Co., New Castle, Pa.

The fallacy of studying the physical properties of clay blends and casting phenomena with little regard to the chemical composition of the water used is discussed. Data are presented as a correlation of commercial-process investigations with laboratory experiments. The paper is a progress report covering an extended study of the subject.

4:00–4:30 P.M.

10. The Control of Crystalline Glazes

By F. H. Norton: Mass. Institute of Technology, Cambridge, Mass.

In this investigation there is carried out the carefully controlled heat treatment of a single crystalline glaze in which both the crystallizing and growth velocity were determined for the four types of crystal produced. It was found possible to produce crystals at any desired location by seeding; their size could be controlled by the growing time and their shape by the growing temperature. Commercial production of crystalline glazes is possible if close temperature control is maintained.

WHITE WARES DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Astor Gallery

Wednesday Forenoon, March 23, 1937: 9:30 A.M.–12:00 M.

9:30–10:00 A.M.

11. Acid and Base Binding Capacities and Viscosity Relations in Certain Whiteware Clays

By Edward C. Henry and Nelson W. Taylor: Dept. of Ceramics, Pennsylvania State College, State College, Pa.

In studying the relationships between the chemical and the physical behavior of clay slips, correlations otherwise obscured are brought out if the clay is first carefully purified. Electrodialysis seems to be an effective method of removing interfering adsorbed electrolyte from clay in preparing it for such investigations. Electrodialyzed samples of several whiteware clays in wide use in the ceramic industry have been found to behave chemically as weak acids. The amount of NaOH necessary to neutralize the "acids" coincides with the smallest amount sufficient to produce the minimum viscosity in suspensions of these clays. The p_H of exchange neutrality (to be defined) of each clay agrees closely with a maximum in its p_H-viscosity curve. At this point, the addition of either HCl or NaOH will reduce the viscosity, although not equally. As further amounts of NaOH are added, two effects are recognized. Some clays continue to become more fluid until complete deflocculation, while other clays pass first through a range of concentrations in which NaOH causes increasing viscosity. A possible explanation of this is offered.

10:00–10:30 A.M.

12. Significance of Particle Size within the Clay Fraction

By Roger H. Bray: Dept. of Agriculture, Univ. of Illinois, Urbana, Ill.

The method of Steele and Bradfield for the determination of particle-size distribution, which gives five size fractions within the clay fraction, has been applied to some ceramic clays. Each clay is found to have a characteristic size-distribution curve. Wide variations in size distribution within clays having similar amounts of clay are found. Some clays are found to be extremely high in material smaller than 0.0000625 mm. in diameter, while some clays are characterized by having practically none of this size fraction. The possible use of the data in blending clays is suggested.

10:30–11:00 A.M.

13. X-Ray Investigation of the Pyrochemical Changes in Missouri Halloysite

By Frank J. Zvanut: School of Mines & Metallurgy, Univ. of Missouri, Rolla, Mo.
Lyman J. Wood: St. Louis Univ., St. Louis, Mo.

The authors present the results of an X-ray study of the chemical changes that take place during the progressive firing of Missouri halloysite. A General Electric multiple-

diffraction unit was used to obtain patterns of samples that had been fired at temperatures ranging from 350°C to the melting point, about 1800°C, at 50° intervals. Twenty-three of these samples were fired for 12-hour periods, five for 200-hour periods, and a few at the higher temperatures for shorter periods of time. The results seem to indicate the dehydration of the kaolin mineral around 450°C, the precipitation of a modified phase of gamma-alumina around 900°C, the appearance of mullite at 1150°C, and the crystallization of cristobalite at about 1350°C, with its subsequent disappearance above 1500°C. A short summary of the results of the chemical and petrographic studies, which were made along with the X-ray study and which have been reported elsewhere, is appended.

11:00–11:30 A.M.

14. Cristobalite Formation as a Factor in the Freezing of Pyrometric Cones

By Paul L. Smith: Orton Foundation Fellow, Pennsylvania State College, State College, Pa.

The freezing of certain pyrometric cones is due to the development of cristobalite from the glass phase, as shown by thermal-expansion curves and X-ray data. The thermal-expansion curves of cones frozen in commercial kilns show a high rate of expansion between 100°C and 250°C, similar to curves of clays which develop cristobalite. X-ray patterns of frozen cones show an increase of intensity of cristobalite lines as compared with the pattern of a cone having normal deformation characteristics. A condition similar to freezing as it occurs in commercial kilns was produced in various cone batches by controlled heat treatments. X-ray patterns, thermal expansion curves, and flow tests were used to establish this similarity.

11:30–12:00 M.

15. Business Session

WHITE WARES DIVISION PROGRAM (continued)

Waldorf-Astoria Hotel: Astor Gallery

Wednesday Afternoon, March 24, 1937: 2:00 P.M.–5:00 P.M.

2:00–2:25 P.M.

16. Study of the Influence of Different Firing and Cooling Rates on the Properties of a Semivitreous China Body

By Preston W. French and Arthur S. Watts: Dept. of Ceramics, Ohio State Univ., Columbus, Ohio

A typical semivitreous china body was molded, dried under carefully controlled conditions, and divided into nine sets which were fired at three different rates and cooled at three different rates. The influence of the different treatments on physical properties is presented in tables and curves.

2:25–2:50 P.M.

17. Classification of Ceramic Tableware for the Guidance of the Consumer

By Arthur S. Watts: Dept. of Ceramics, Ohio State Univ., Columbus, Ohio

A classification is given of vitrified, semivitrified, and porous tableware on the basis of such physical properties of the body and glaze as would influence the purchaser in making a selection.

2:50–3:15 P.M.

18. Summation of the Whiteware Research Investigation Conducted at the New York State College of Ceramics

By R. M. Campbell: New York State College of Ceramics, Alfred, N. Y.

3:15–3:40 P.M.

19. Influence of Compositions of Underslips, Glazes, and Bodies on Blistering and Other Spraying Defects

By H. G. Schurecht and J. F. McMahon: New York State College of Ceramics, Alfred, N. Y.

The tendency of certain underslips, glazes, and bodies to cause blistering and pinholes during spraying and cracking during drying was studied. These defects are especially apparent when the intervals of time between spraying the successive coats or underslip and glaze are long, and are probably the latent source of many glaze defects. It was found that this trouble could be reduced by selecting certain ball clays for the underslip, by reducing its thickness, by using a coarse-grained body in place of a fine-grained body, and by using glazes of certain compositions.

3:40–4:05 P.M.

20. Comparison of the Viscosity and Wetting Ability of Some Glazes

By C. Major Lampman: New York State College of Ceramics

Glazes were allowed to flow at furnace temperatures in a clay trough set at an angle of 45°, and the comparative distances at which these glazes flowed were checked. The area which a given disk of glaze covers at furnace temperatures was used as a measure of its wetting ability at furnace temperatures.

4:05–4:30 P.M.

21. Effect of Iron and Its Compounds on the Color and Properties of Ceramic Material and Engobes

By T. N. McVay: Univ. of Alabama, University, Ala.
C. W. Parmelee: Dept. of Ceramics, Univ. of Illinois, Urbana, Ill.

Iron compounds were introduced into engobes of varying clay, silica, and feldspar content by the following methods: direct additions of commercial iron oxides, adsorption from ferric-hydroxide sols, use of stains composed of calcined mixtures of ferric and aluminum hydroxides, the

addition of silica gel in which ferric hydroxide was precipitated, and by precipitation with ammonia as the hydroxide from ferric chloride. The last two of these methods were the most satisfactory. Buff colors were obtained with engobes of high clay content, browns with high silica, and reds with high feldspar. A general study was made of the coloring of ceramic materials by iron oxide, and it was found that the particle size of these materials as well as that of the ferric oxide was of primary importance. An investigation of the effect of gases on the iron oxide present in engobes gave results that are in agreement with the work done on the oxides of iron at the Geophysical Laboratory of the Carnegie Institution of Washington.

4:30–4:55 P.M.

22. Distribution of Glaze Constituency as Affecting Certain Glaze Properties

By J. H. Koenig: Engineering Experiment Station, Ohio State Univ., Columbus, Ohio

A dinnerware-glaze composition was used in preparing a series of glazes differing essentially in the distribution of that composition between frit or frits and mill addition. The effect of such variation was observed in respect to viscosity and planing tendencies of the glaze as well as the gloss and texture of glazed ware. Texture was recorded photomicrographically using dark-field illumination. Comparisons were made with the textures of commercial whiteware products as shown by this means.

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ACTIVITIES OF THE SOCIETY

REPORT OF THE COMMITTEE ON CERAMIC EDUCATION FOR 1936

By Harold E. White, *Chairman*

The Committee on Ceramic Education has been working on the possibility of setting up a method of accrediting of schools teaching Ceramics and Ceramic Engineering as its major objective this year.

As the work progressed it was learned that the Committee on Engineering Schools of the Engineers' Council for Professional Development had been working on a similar project, covering all phases of engineering for the last three years. Through coöperation with several of the officers of the Society, contact was made with this organization.

An outline of their work and methods of accrediting Engineering Schools follows[1]:

"The Engineers' Council for Professional Development, a joint body concerned with the enhancement of the status of the engineer and of the profession, has been constituted by its constituent bodies, the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the Society for the Promotion of Engineering Education, the American Institute of Chemical Engineers, and the National Council of State Boards of Engineering Examiners, as an agency for the accrediting of colleges of engineering. This step has the purpose of performing through a single accrediting by one body representing the organized profession what is now being done by numerous organizations individually."

Basis for Accrediting Engineering Colleges

"I. Purpose of accrediting shall be to identify those institutions which offer professional curricula in engineering worthy of recognition as such.

"II. Accrediting shall apply only to those curricula which lead to degrees.

"III. Both undergraduate and graduate curricula shall be accredited.

"IV. Curricula in each institution shall be accredited individually. For this purpose, the E.C.P.D. will recognize the six major curricula: chemical, civil, electrical, mechanical, metallurgical, and mining engineering, represented in its own organization, and such other curricula as are warranted by the educational and industrial conditions pertaining to them.

"V. Curricula shall be accredited on the basis both of qualitative and quantitative criteria.

"VI. Qualitative criteria shall be evaluated through visits of inspection by a committee or committees of qualified individuals representing the E.C.P.D.

"VII. Quantitative criteria shall be evaluated through data secured from catalogs and other publications, and from questionnaires.

"VIII. Qualitative criteria shall include the following:

(1) Qualifications, experience, intellectual interests, attainments, and professional productivity of members of the faculty.

(2) Standards and quality of instruction:

(*a*) In the engineering departments.

(*b*) In the scientific and other coöperating departments in which engineering students receive instruction.

(3) Scholastic work of students.

(4) Records of graduates both in graduate study and in practice.

(5) Attitude and policy of administration toward its engineering division and toward teaching, research, and scholarly production.

"IX. Quantitative criteria shall include the following:

(1) Auspices, control, and organization of the institution and of the engineering division.

(2) Curricula offered and degrees conferred.

(3) Age of the institution and of the individual curricula.

(4) Basis of and requirements for admission of students.

(5) Number of students enrolled: (*a*) in the engineering college or division as a whole and (*b*) in the individual curricula.

(6) Graduation requirements.

(7) Teaching staff and teaching loads.

(8) Physical facilities; the educational plant devoted to engineering education.

(9) Finances: investments, expenditures, sources of income.

"It will be noted that institutions will be accredited both on qualitative and quantitative criteria with emphasis on the former.

"Information supplied by means of the questionnaire, or otherwise, is for the confidential use of the E.C.P.D. and its agents and will not be disclosed without the specific written authorization of the institution concerned.

"Inasmuch as there are movements under way at the present time in the direction of liberalizing the classroom requirements in certain engineering curricula, and for other reasons, E.C.P.D. considers that it is not desirable to fix any specification of the number of hours and credits which will be required in order that a curriculum may be accredited. Absolute minimum standards of educational processes have been avoided as likely to fetter progress. Final action of the Council as to accrediting will be taken upon the recommendation of the Committee on Engineering Schools after careful consideration of the information secured concerning each institution.

"Each curriculum offered by individual institutions will be accredited separately. The six major curricula, chemical, civil, electrical, mechanical, metallurgical, and mining,

[1] 1934 Report, E.C.P.D., p. 10.

are listed in the questionnaire, but such other engineering curricula as the institution may desire to submit for accrediting will also be considered.

"Upon completion of the accrediting, the Council will publish a list of approved institutions for the assistance of such organizations as may wish to employ the list, but the Council is not itself empowered to take any further action.

"Early in 1935, approval of E.C.P.D. as the accrediting agency for engineering schools was received from the seventh of the constituent societies to take action in this regard, and the Committee proceeded with the organization of delegatory committees in the first two regions.[2]

"Members of the main Committee were assigned the chairmanship of the regional delegatory committees as follows:

Region I: New England, H. P. Hammond
Region II: Middle Atlantic, Karl T. Compton
Region III: North Central, P. H. Daggett
Region IV: Southeastern, H. A. Curtis
Region V: South Central, A. A. Potter
Region VI: Southwestern, G. M. Butler
Region VII: Northwestern, I. C. Crawford

"Of the various engineering bodies constituting the E.C.P.D., only the American Institute of Chemical Engineers had an accrediting scheme in active operation. The A.I.Ch.E. has joined the other engineering societies in designating the E.C.P.D. as an accrediting agency and has published a statement amplifying this relationship.

"Formal action in accrediting engineering curricula in educational institutions in New England and Middle Atlantic states by the Engineers' Council for Professional Development was announced on October 25 by H. H. Henline, Secretary of the Council.[3]

"Curricula in schools in the United States, not included in the New England and Middle Atlantic areas, will be investigated during the coming year by the Committee on Engineering Schools, and a complete list of accredited curricula will be issued when approved by the Council.

"In drawing up its list of accredited engineering curricula, the entire Council considered every curriculum separately and based its decision on the reports made by a number of groups of engineers and educators who visited the institutions under the direction of the Council's Committee of Engineering Schools, of which Karl T. Compton, President, Massachusetts Institute of Technology, is chairman. Inspection visits were made by one of these groups to 90% of the educational institutions in the areas mentioned offering engineering curricula leading to degrees and were made only at the request of the institution formally applying for accrediting by the Council.

"The general expenses of developing the accrediting program will be borne in part by a grant of funds from Engineering Foundation. Expenses of the visiting committees representing the Council will be met by a charge made to the individual institutions sufficient to cover cost of travel and subsistence during the inspection. This charge will be on a basis of $100 for the first curriculum to be considered, and $50 for each additional curriculum with a maximum of $400 for any single school. This is in accord with the practice of a number of other accrediting agencies.[4]

"Committees of inspection will comprise both teachers and practicing engineers, the criteria for selection being competency to judge educational institutions, good judgment, and availability.

"On October 22, 1936, the trustees of the Carnegie Corporation of New York made a $16,000 grant in support of the work of the E.C.P.D. for the year October 1, 1936, to September 30, 1937. Additional appropriations in the amount of $3450 have been made to Council by the Engineering Foundation. Rental cost for Council's office recently opened in the Engineering Societies Building is expected to be met by three of the participating societies, the American Society of Mechanical Engineers, the American Society of Civil Engineers, and the American Institute of Electrical Engineers. Including this rental value a total fund of over $21,000 is available, of which $19,450 will be applied directly to the advancement of Council's program for enhancing the professional status of the engineer through the coöperative support of the national organizations directly representing the professional, technical, and legislative phases of the engineer's life.[5]

"In connection with the newly opened office of E.C.P.D., R. I. Rees is devoting full time to his duties as Vice-Chairman of the Council.

Program of Committee on Engineering Schools for 1936 and 1937

"In accordance with authorization given by its constituent bodies E.C.P.D., through its Committee on Engineering Schools, will continue the work of visiting engineering colleges during the current academic year and expects to complete the major portion of its program before the close of the year.[6] Institutions in Regions III to VII inclusive were notified in March, 1936, that E.C.P.D. was prepared, upon invitation, to visit and inspect the schools with a view to considering curricula submitted for accrediting. Of the 109 institutions in these regions that are known to confer degrees in engineering, 61 had requested inspection by September 1, 1936, making 103 institutions in all (including those in Regions I and II), that have submitted requests. Visits to these institutions will be made during the year, beginning about November 1 or shortly thereafter. During the same period institutions in Regions I and II whose requests for investigations were received too late for consideration last year will also be considered.

No courses in Ceramic Engineering have as yet been accredited although other engineering courses in institutions teaching ceramics have been given accredited standing.

In order to apply this accrediting scheme to ceramic engineering, it is first necessary to define Ceramic Engineering.

Ceramic Engineering Defined

Ceramic Engineering is that branch of engineering concerned with (1) the mining, refining, and processing of

[2] 1935 Report, E.C.P.D.
[3] Information Comm., *ibid.* (Oct. 15, 1936).
[4] E.C.P.D. List of Accredited Undergraduate Curricula.
[5] *Ibid.*, Nov. 6, 1936, "Engineering Council Receives Grant from Carnegie Corp."
[6] *Jour. Eng. Ed.*, S.P.E.E. (Oct., 1936), Suppl., Vol. VII, No. 2.

minerals and rocks, excepting coal, oil, and ores as such; (2) the manufacture of products therefrom; and (3) the design and construction of the necessary equipment and structures.

Chemistry, physics, and mathematics are the underlying sciences of ceramic engineering, and economics is its guide in practice.

The following statement has been prepared for use by the Committee on Education of the American Ceramic Society.

Recommendations to Institutions Prepared to Teach Ceramic Engineering

A school desiring accrediting of its curricula in ceramic engineering by the Engineers' Council for Professional Development should communicate directly with the E.C.P.D. Committee on Engineering Schools and notify the Committee on Education of the American Ceramic Society. The E.C.P.D. Committee will, in the course of its regular procedure, arrange for inspection of the educational facilities of the school by a regional subcommittee.

To qualify for accrediting, an institution must maintain, in addition to the general requirements, acceptable standards in the following particulars:

(1) Adequate and competent faculty teaching ceramic engineering.

(2) Satisfactory curriculum, including an appropriate number and scope of courses in ceramic engineering, ceramics, chemistry, and other branches of science and engineering and cultural subjects.

(3) Adequate and appropriate facilities for laboratory and library work in ceramic engineering, as well as in other branches of ceramics, chemistry, and physics.

(4) Satisfactory relationship of the ceramic engineering department and curriculum to other divisions of engineering and science and a proper support of ceramic engineering by the general executive and administrative officials of the institution.

(5) Regular graduation of a reasonable number of students with bachelor's or advanced degrees who, by subsequent experience, give evidence of suitable training during their collegiate affiliation with the institution.

The following sections discuss these five requirements and, it is hoped, will aid not only the faculty of an institution desiring accrediting, but will also be a stimulus toward higher standards in all particulars, even in institutions that for the present are unable to meet fully the requirements as an accredited school.

(1) Faculty Requirements

An adequate, full-time faculty should be available for ceramic engineering instruction, the number of persons of each rank being dependent on the number of students pursuing the course in ceramic engineering. In general, the staff and budget allotted to ceramic engineering should be on a par with those of other branches of engineering having approximately the same number of students.

The Committee deprecates the use of undergraduates or even graduate students as major instructors in charge of classes of ceramic engineers, even in the freshman year. The service of such student assistants should be limited appropriately and be under adequate supervision by more experienced faculty members. The Committee also deprecates the "inbreeding" which is found too frequently in school faculties, and recognizes that "cross-breeding," unless very carefully and intelligently handled, may be even more dangerous than "inbreeding." Adequate industrial experience as well as other qualifications of a teacher should receive consideration.

It is the observation of the Committee that ceramic engineering research activity, which may include either noncommercial, fundamental investigations or high-grade research work for industry, is usually found in those institutions which qualify for accrediting. The absence of such activity may be traced to several causes: lack of interest by staff members, teaching schedules which are too heavy, deprecation of research by the administration of the institution, lack of space and funds for the purpose, or a staff promotion policy which ignores research accomplishment as a desirable qualification. The Committee believes that the spirit of research in any engineering department keeps the teaching staff interested in the newest developments in this rapidly growing field and that, in institutions where it is absent, the teaching is likely to settle down into routine repetition from year to year, with the result that the courses become out of date within a very few years. Evidence of the kind of research the Committee has in mind is usually the publication of important papers, although it is realized that industrial research work is often of a confidential nature and can not be published.

(2) Curriculum

The Committee does not desire to set up any hard and fast limits on the scope and character of the curriculum or on the relative amounts of time that should be devoted to the several groups of studies which will make up a satisfactory course for instruction in ceramic engineering. The Committee has, however, made a careful analysis of the content of such courses in the more widely recognized curricula. The following distribution of time is typical of courses which produce an effective composite for the instruction of well-prepared graduates from schools offering a four-year undergraduate course in ceramic engineering.

	(%)
Mathematics	12
Chemistry	12
Physics	6
Geology and Mineralogy (inc. Petrography)	7
Ceramic Engineering (inc. 4 in Ceramic Design)	20
Other Engineering	18
Cultural Subjects, etc. (English, modern languages, economics, physical education, hygiene, military science, sociology, history, other sciences, and electives)	25

Mechanics and Strength of Materials	5
Mechanical Engineering	2½
Electrical "	2½
Mechanical Drawing	5
Fuels and Combustion	1¼
Pyrometry	½
Surveying	1¼
	18

The Committee is of the opinion that the tendency to extend ceramic engineering study into graduate years, especially on the part of those students of special aptitude in the theoretical divisions, is one that should be encouraged, because of the widely recognized difficulty of giving

adequate instruction within a period of four years, especially if any attempt is made to teach methods of research in science or engineering.

The Committee emphasizes the importance of thorough training in the fundamentals both of science and engineering, with particular reference to the application of physical chemistry and the study of phase equilibria.

The Committee emphasizes the importance, as a part of any engineering curriculum, of a proper training in English, a reasonable familiarity with English literature, and other cultural training which is vital for full realization of professional opportunity in any field.

Undue specialization even within the field of ceramic engineering should generally be avoided since a four-year course in ceramic engineering, in the judgment of the Committee, rarely affords time for such industrial specialization. The Committee does not wish to imply that specialized courses, particularly in smaller institutions meeting local and specialized demand, are undesirable. It merely wishes to emphasize that those trained in such courses are usually not broadly prepared in the general ceramic field.

(3) Administrative Relations

The Committee believes that the cause of ceramic engineering education will be more rapidly advanced if this subject is taught by an independent or substantially independent department and not by a subordinate section of some other department. For the same reason, the Committee believes that in large universities the ceramic engineering curriculum should be administered with other engineering courses in the school of engineering and not in the school of arts and sciences.

The administrative relations between ceramic engineering work and that of other departments of a university are not necessarily important *per se;* but it is the observation of the Committee that where definite recognition of ceramic engineering by an arrangement substantially equal to that of an independent department is not given, the standards of instruction usually suffer. This is in part the consequence of placing the final authority for technical matters of curriculum and student supervision in the hands of those who do not always fully appreciate the professional significance of ceramic engineering. In part, it is the consequence of reducing the faculty men in such a subordinate unit to a lower professional rating than they would have if directing an independent department with the full academic recognition which attaches to such independence.

(4) Necessary Facilities

For satisfactory instruction in ceramic engineering, there must be available adequate laboratory facilities to afford the student opportunity for operation and experimental use of such characteristic industrial machinery as is used for the practical operations of ceramic industries. The Committee believes that any institution which lacks such facilities or which does not provide adequate time in its curriculum for laboratory work is unable to give a well-balanced training in ceramic engineering.

Library facilities, often those used in common with the chemistry department and all laboratory facilities for the requisite courses in chemistry and other sciences are, of course, essential, both for the faculty and the student body. An institution lacking such facilities will rarely be able to evidence sufficient research activity to merit recognition, even though qualified in all other respects for accrediting.

(5) Record of Graduates

The Committee will give attention in investigation of any institution to the showing which has been made by those who have been trained in that institution as undergraduates or as graduate students of ceramic engineering. An evidence that such alumni are regularly taking a creditable part in the ceramic engineering profession will, in the judgment of the Committee, be a factor favoring accrediting.

Scope of Accrediting by the American Ceramic Society

At the present time it is felt that the accrediting of the undergraduate ceramic engineering courses is about all the Committee will be able to take care of.

Later, accrediting of ceramic technology, ceramic art, and graduate courses may be attempted. This may be through coöperation with some similar agency or with the E.C.P.D. itself or by the American Ceramic Society Committee independently if necessary.

The Committee on Ceramic Education regards the matter of final recommendation for accrediting as a minor phase of its activity. Its chief work is coöperation with educational institutions seeking to improve their ceramic engineering curriculum, faculty, or facilities. The Committee will not proffer unsought advice or express uninvited opinions; but it stands ready to do anything it may in the cause of improving ceramic engineering education.

As the work progressed it became evident that several important changes in the set-up and work of the Committee would be necessary if the Society were to coöperate with the E.C.P.D.

Coöperation with E.C.P.D.

The E.C.P.D. is ready and willing to coöperate with the Committee on Education of the American Ceramic Society in accrediting Ceramic Engineering courses. Their position is outlined in a letter from Allen W. Horton, Jr., Secretary of Committee on Engineering Schools, to your Chairman,

"The Committee has agreed that to each curriculum in ceramic engineering submitted, there will be assigned one or more of the representatives who have been nominated by the A.I.Ch.E. to serve on the seven regional committees. The reason for this is, of course, that ceramic engineering includes a considerable amount of chemistry, and is, therefore, more nearly in the realm of the A.I.Ch.E. than of any of the other constituent societies of the Council. These men will inspect the curriculum, and the procedure of accrediting will be identical to that followed in all of the other branches of engineering, with the exception of chemical engineering, where an experienced accrediting committee existed prior to the inception of E.C.P.D. In addition to the representative of the A.I.Ch.E., the Committee plans in all cases to invite a prominent ceramic engineer to join the Committee of Inspection, so that he may serve in an advisory capacity to the Visiting Committee, and particularly, to the individual or individuals who have been designated to inspect the curriculum in ceramic engineering. This is in line with the procedure which has been followed in the case of certain other specialized curricula.

"While the procedure of the Committee on Engineering Schools has worked effectively, and there appears to be no reason for changing it, this does not in any sense mean that the Committee would not welcome the advice and assistance which an agency not directly tied in with E.C.P.D. could give. The Committee wishes to do the best job it is capable of in preparing an acceptable list of accredited curricula.

"There are two ways in which your Society could be of immediate assistance to E.C.P.D. in its accrediting program. In the first place your Committee on Ceramic Education might outline for E.C.P.D. what it considers the most desirable content and auspices of a curriculum in ceramic engineering. Further than this, you could draw up for the Council a list of prominent ceramic engineers who are familiar with the educational aspects of ceramic engineering and from which E.C.P.D might draw when it wished to have someone on hand to advise a Committee of Inspection during its visit to an institution."

Your Chairman feels, based on his several conferences with the various members of the E.C.P.D., that this is a fair agreement. In his letter, however, of November 17, 1936, to Mr. Horton, your Chairman protested the apparent inclusion of ceramic engineering with chemical engineering, pointing out that while ceramic engineering includes a considerable amount of chemistry, it also includes mining, geology, and other engineering subjects somewhat covered by the A.I.M.M.E.

It was therefore requested that the American Ceramic Society relations with E.C.P.D. be independent of the American Society of Chemical Engineers.

Mr. Horton replied on November 20, 1936, that "in addition to a representative of the A.I.Ch.E. serving on the committee designated to inspect each curriculum in Ceramic Engineering . . . . a representative of the A.I.M.-M.E. will also be assigned to each curriculum in ceramic engineering wherever such procedure is at all possible."

This report was submitted to the Board of Trustees of the Society at their meeting Friday, January 29, 1937.

In addition to the Board members, A. S. Watts, Dean of Fellows and President of the Association of Ceramic Educators; J. L. Carruthers, representing the Education Committee of the Ceramic Educators; C. W. Parmelee, Chairman of the Fellows Education Committee; A. F. Greaves-Walker, Herald of Keramos and Chairman of its Education Committee; as well as the Chairman of your Committee were present as invited guests to discuss this report.

The Chairman of this Committee is indebted to the above four educators for their assistance in revamping the definition of Ceramic Engineering, for the outline of the Ceramic Engineering curriculum, as well as for review and revision of parts of this Report.

The following recommendations were adopted:

(1) That the Committee on Ceramic Education of the American Ceramic Society be empowered to coöperate with the Committee on Engineering Schools of E.C.P.D. in accrediting schools teaching ceramic engineering.

(2) That the Committee on Education of the American Ceramic Society be appointed by the President of the Society from the Society at large (eliminating the previous Division set-up) and to consist of one member from the three general classes of our membership, Ceramic Engineers, Technologists, and Artists, and in addition one Industrialist and one Educator.

Although the last two would also fall into one of the first three classifications, their respective functions on the Committee would be to represent the interests of their designated field in the training of men and women for the ceramic industry.

(3) The members of the Committee to be appointed to serve for five years, except that initially, in order to assure continuity of policy, they be appointed for the following terms:

Educator	One year
Industrialist	Two years
Technologist	Three years
Artist	Four years
Engineer	Five years

The Chairman of this general Committee is to be its oldest member or the one whose term has one year to run. The first chairman would thus be the ceramic educator.

(4) Organization of specific subcommittees of five members each in each of the three fields mentioned above were authorized (engineering, technology, and art), the representative of that class of member on the general committee acting as chairman of the subcommittee.

(5) The subcommittees of the three general groups will function as accrediting agencies in their particular sphere and coöperate with any existing agencies. (For example, the engineering committee will coöperate directly with E.C.P.D., subject to the approval of the general Committee and the Board of Trustees of the Society.)

(6) The present Committee on Education of the American Ceramic Society is instructed to coöperate at once with the E.C.P.D. and to function until the new organization is perfected and to arrange for advisers to act with E.C.P.D. inspection committees if necessary.

Signed by the Committee on Education:
H. E. WHITE, *Chairman:* LUKE BECKERMAN, W. L. FABIANIC, TOM FALKNOR, L. J. TROSTEL, A. P. POTTS, E. E. MARBAKER, AND E. H. FRITZ.

SUBCOMMITTEE APPOINTED BY PRESIDENT FLINT

F. C. Flint, President of the Society, has appointed the following Subcommittee to function for the engineers and to coöperate with the E.C.P.D.: E. H. FRITZ, *Chairman;* C. F. TEFFT, R. E. BIRCH, H. L. COOK, AND A. F. GREAVES-WALKER.

This Subcommittee is to limit its activities entirely to its own field. Normally it will be the outside contact with the other engineering groups and educational registration endeavors to which it is exposed. The Subcommittee, however, is under the guidance of the general Steering Committee and has the general attitude of the Society at heart.

DATA ON CERAMIC EDUCATION

H. E. White, *Chairman;* and E. E. Marbaker and E. H. Fritz, Committee on Education

CERAMIC SCHOOLS AND CERAMIC COLLEGIATE COURSES

School	Ceramic Course Founded	Graduates B.Cer.E.	M.Sc.	Ph.D.	Soph.	Juniors	Seniors	Graduate Students	Special and Unclassified
Ohio State Univ. (Ceramic Eng. & Tech.)	1895	399	47	19	19	16	11		
Ohio State Univ. (Ceramic Art)	6 graduates				3	3	4		
Georgia School of Technology	1924	40			8	2	1	5	
Univ. of Washington	1919	15	24		2	3	1	2	
Univ. of Toronto	1925	15				1	1	2	
Massachusetts Institute of Tech.	1934	No undergraduate course in Ceramics; at present 6 are registered for their Doctorate and 1 for the Master's Degree							
Univ. of North Dakota	Offers courses in Ceramics but does not offer a full curriculum in Ceramic Engineering								
Univ. of Pittsburgh	Does not have a special course in Ceramics but offers graduate instruction in glass technology								
Virginia Polytechnic Institute	1928	None			9	5	1		
Univ. of Missouri	1926	46			4	0	3		
Alfred University (N. Y. State College of Ceramics)	1900	400			88	56	51		15
West Virginia Univ.	Graduates and enrollment are distributed among Departments of Ceramic Art, General Ceramic Technology, and Engineering and Glass Technology Does not have a regular department of Ceramics; ceramic courses are part of Chemical Engineering work and all students graduating from this department receive B.S.Ch. E. degree								
Iowa State College	1906	70	4		2	5	1		
Univ. of North Carolina	1923	51			22	9	6		
Univ. of Illinois	1905	279		6	69	51	30		
Pennsylvania State College	1925	56			8	4	6	8	
Univ. of Alabama	Does not have a regular department of Ceramics; ceramic courses are part of Chemistry Department and are optional								
Rutgers Univ.	No replies to inquiries								
TOTAL		1371	75	25	234	155	116	17	15

EDUCATIONAL TRAINING OF FELLOWS AND MEMBERS OF THE SOCIETY*

	Fellows (No.)	(%)	Members (No.)	(%)
Total number reported	179		650	
No degree	33	18.4	69	10.6
One or more degrees	146	81.6	581	89.4
Higher degrees	66	36.8	161	24.8
Recipients of no degree	33	18.4	69	10.6
No collegiate training	10	5.6	38	5.9
One year " "	3	1.7	10	1.5
Two years " "	5	2.8	4	0.6
Three years " "	15	8.4	7	1.1
More than three years			10	1.5
Recipients of one or more degrees	146	81.6	581	89.4
Specific training in Ceramics	71	39.6	303	46.6
B.S. in Ceramics	64	35.7	46	7.1
B.S. in Ceramic Engineering			242	37.2
E.M. in Ceramic Engineering	7	3.9		
B.S. in Glass Technology			5	0.8
B.S. in Ceramic Art			10	1.5
No specific training in ceramics	75	41.9	278	42.8
B.S. in Chemistry	26	14.5	61	9.4
B.S. in Chemical Engineering			67	10.3
B.S. in C.E., E.E., M.E.	10	5.6	50	7.7
B.S. in E.M., Met.E.			15	2.3
A.B., B.S., etc.	36	20.1	85	13.1
Not classified	3	1.7		
Technical training	107	59.8	496	76.4
In ceramics	71	39.7	303	46.6
Not in ceramics	36	20.1	193	29.8
Academic training	36	20.1	85	13.1
Not classified	3	1.7		

EMPLOYMENT STATUS OF MEMBERS ONLY

	Graduates (581) (No.)	(%)	Nongraduates (69) (No.)	(%)
Teaching	45	7.75	3	4.35
Art	2	0.34	5	7.25
Production	305	52.51	27	39.25
Sales	36	6.20	4	5.80
Executive	88	15.11	29	42.00
Research	101	17.41	1	1.50
Unemployed	2	0.34		
Not in ceramics	2	0.34		

* Compiled by E. E. Marbaker.

EMPLOYMENT STATUS OF MEMBERS (NOT FELLOWS)

College	No.	Teaching	Art	Production	Sales	Executive	Research
Albion	1	1	..	..	..	..	..
Alfred	47	6	..	28	1	2	9
Amherst	1	..	..	1	..	..	..
Annapolis	1	..	..	..	1	..	..
Bates	1	..	..	1	..	..	..
Brooklyn Poly.	1	..	..	..	..	1	..
Bucknell	3	..	..	1	..	..	2
California	4	..	..	1	1	2	..
Capital	1	..	..	..	1	..	..
Carnegie Tech.	7	1	..	5	..	..	1
Case	10	1	..	4	2	1	2
Catholic Univ.	1	..	..	..	..	1	..
Chattanooga	1	..	..	1	..	..	..
Chicago	2	..	..	..	..	..	2
Cincinnati	1	..	..	..	..	..	..
Colgate	1	..	..	..	1	..	..
Colorado College	1	..	..	..	..	..	1
Colorado Sch. Mines	1	..	..	..	..	..	1
Columbia	5	..	..	1	1	2	..
Cornell	21	..	..	8	2	7	4
Dartmouth	1	..	..	1	..	..	..
Defiance	1	..	..	..	..	1	..
Denison	1	..	..	1	..	..	..
Drake	1	..	..	..	..	1	..
Geneva	2	..	..	2	..	..	..
Georgia Tech.	7	1	..	5	..	1	..
Gettysburg	1	..	..	..	..	1	..
Grinnell	1	..	..	..	..	..	1
Hamilton	1	..	..	..	..	..	1
Harvard	5	..	..	..	..	3	2
Heidelberg	1	..	..	1	..	..	..
Illinois	66	2	1	46	6	4	7
Indiana	2	1	..	..	..	..	1
Inst. of Mines (?)	1	..	..	..	1	..	..
Iowa State	23	2	..	13	2	2	3
Iowa Univ.	1	..	..	..	..	..	1
Kansas	2	1	..	..	..	..	1
Kenyon	1	..	..	..	..	..	1
Lehigh	5	..	..	1	1	1	2
Maine	1	..	..	..	..	..	1
Maryland	1	..	..	1	..	..	..
Mass. Inst. Tech.	21	5	..	4	1	5	6
McPherson	1	..	..	..	..	..	1
Michigan Univ.	9	..	..	5	..	2	2
Michigan State	1	..	..	1	..	..	..
Minnesota	5	2	..	1	..	1	1
Missouri Sch. Mines	10	2	..	3	3	..	2
Monmouth	1	..	..	..	..	..	1
Montana	1	..	..	..	..	..	1
Nebraska	1	..	..	..	..	1	..
North Carolina State	8	..	..	5	..	..	3
North Carolina Univ.	2	..	..	2	..	..	..
North Dakota	1	1	..	..	..	..	..
Northwestern	1	..	..	..	..	..	1
Oberlin	1	..	..	..	..	..	1
Ohio Univ.	1	..	..	1	..	..	..
Ohio State	131	4	1	97	6	14	19
Ohio Wesleyan	3	..	..	..	..	..	3
Oklahoma A. & M.	1	..	..	..	..	1	..
Penn State	15	1	..	11	1	1	1
Pennsylvania	4	..	..	1	..	2	1
Pittsburgh	1	..	..	1	..	..	..
Pomona	1	..	..	..	..	..	1
Pratt Inst.	1	1	..	..	..	..	..
Princeton	4	..	..	1	..	3	..
Puget Sound	1	..	..	..	..	..	1
Purdue	3	..	..	2	1	..	..
Rensselaer Poly.	2	..	..	1	..	1	..
Rochester	1	..	..	..	..	1	..
Rose Poly.	2	..	..	..	..	1	1
Rutgers	20	2	..	12	..	1	5
South (Univ. of)	1	..	..	1	..	..	..
South Dakota	1	..	..	..	..	..	1
Southwestern	1	..	..	1	..	..	..
Stanford	2	1	..	..	..	..	1

EMPLOYMENT STATUS OF MEMBERS (NOT FELLOWS) (*concluded*)

College	No.	Teaching	Art	Production	Sales	Executive	Research
Stevens Inst.	2	..	..	..	..	1	1
Swarthmore	1	..	..	1	..	..	..
Tri-State	1	1	..	..	..	..	..
Tulane	1	1	..	..	..	..	..
Union	1	..	..	..	..	1	..
Villanova	1	..	..	1	..	..	..
Virginia Poly.	3	1	..	..	..	2	..
Wabash	1	..	..	..	..	..	1
Washington	11	2	..	5	..	..	4
Washington & Lee	1	..	..	1	..	..	..
Wash. & Jeff.	1	..	..	1	..	..	..
Western Reserve	2	..	..	1	..	1	..
West Virginia U.	2	..	..	1	..	..	1
West. Va. Wesleyan	1	..	..	1	..	..	..
Williams	1	..	..	..	..	1	..
Wittenberg	1	..	..	..	1	..	..
Wisconsin	4	1	..	2	..	..	1
Worcester Poly.	4	..	..	2	..	2	..
Yale	9	..	..	..	1	8	..
Manitoba	1	..	..	..	..	1	..
McMaster	1	..	..	..	..	..	1
McGill	2	..	..	2	..	..	..
Queens	2	..	..	1	..	..	1
Saskatchewan	3	2	..	..	1	..	..
Toronto	3	..	..	3	..	..	..
European	23	2	..	10	..	7	4
No name given	3	..	..	1	1	..	1
College training (no degrees)	..	..	..	..	..	..	..
(1 year)	10	..	2	3	1	4	..
(2 ")	4	..	..	..	..	4	..
(3 ")	7	..	..	4	..	3	..
(More than 3 ")	10	3	..	6	1	..	..
No college training	38	..	3	14	2	18	1
Total No.	650	48	7	332	40	117	102
Percentage		7.4	1.08	51.1	6.16	18	15.7

CERAMIC CURRICULA*

	Alfred	Illinois	Iowa	Missouri	N. C.	Ohio	Rutgers	Pa. State	Va.	Wash.	W. Va.	Toronto
Mathematics	12.7	11.36	13.62	12.00	12.29	10.5	10.08	9.2	11.93	10.0	12	9.4
Chemistry	16.9	14.39	19.7	20.00	10.22	12.2	19.6	12.7	11.05	11.7	27.4	13
Physics	7.8	7.57	10.88	8.00	4.90	6.3	6.4	6.5	7.06	8.4	6.6	10
English and Literature	5.6	4.55	5.2	8.00	8.61	5.04	4.1	5	9.28	1.7	4.6	1.2
Geology and Mineralogy	4.2	2.27	7.5	4.00	3.69	3.79	6	7	5.3	5.6	2.7	8.2
Mechanics	4.3	6.82	5	4.00	3.69	4.2	2	4	5.31	6.6	7.3	7.7
Engineering drawing	4.2	6.06	3.8	4.00	5.33	5.05	2	1.5	3.54	5	6.6	10
Petrography	2.1	0.00	2.8	5.33	3.70	0	2	2	1.33	1.7	0	3.6
Ceramic — fundamentals	16.2	21.22	14.6	11.33	12.64	21.4	18.3	12.0	9.29	13.9	6.6	12.4
Ceramic — specializations	7.1	6.0	2.36	6.66	4.69	9.68	12.2	8	4.42	8.8	2.6	4.8
Ceramic — research	2.8	0	0	2.00	2.46	2.52	0	3	2.21	4.5	0	3.6
Ceramic — design	4.9	6.06	0	4.67	4.10	6.3	2	2	1.33	0	3	3.5
Surveying	2.1	1.52	1.4	2.67	1.23	2.1	0	3	.88	1.7	1.3	3.6
Foreign languages	0	0	1.4	0	0	0	0	4	0	0	0	0
Economics	2.8	0	4.2	4.00	6.15	0	0	0	5.31	1.7	2	3.6
Electives	5.6	5.36	1.4	0	7.38	5.46	6.5	8.1	13.27	8.3	0	0
Miscellaneous (general)	0	0	3.2	0	4.69	5.46	6.5	9.5	.44	0	9	2.4
Miscellaneous (other engineering)	0	6.82	3.8	3.33	4.5	0	3.2	4	8	10.5	8	3.0

This study was made primarily to review the curricula of the various ceramic schools teaching ceramic engineering. Wherever possible only ceramic engineering was considered. The difference, however, between the schools teaching ceramic engineering and giving a degree in it is as great between the individual schools as is the difference between the ceramic engineering courses in the various schools and the ceramic technology courses.

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* Compiled by E. H. Fritz.

EDUCATIONAL TRAINING OF MEMBERS (NOT FELLOWS)

College	No.	B.S.													Higher Degrees
		Ceramics	Ceram. Eng.	Glass Tech.	Applied Art	Chemistry	Chem. Eng.	Mining Eng.	Met.	E.E.	M.E.	C.E.	B.S.	A.B.	
Albion	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
Alfred	47	7	30	5	4	..	..	..	..	..	..	..	1	..	11
Amherst	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
Annapolis	1	..	...	..	..	..	..	..	..	..	..	..	1	..	...
Bates	1	..	...	..	..	..	..	..	..	..	..	..	1	..	...
Brooklyn Poly.	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
Bucknell	3	..	...	..	..	..	1	..	..	..	..	..	2	..	2
California	4	..	..	..	..	1	..	2	..	..	..	..	..	1	1
Capital	1	..	...	..	..	..	..	..	..	..	..	..	1	..	...
Carnegie Tech.	7	..	...	..	..	..	1	..	..	..	..	..	5	1	1
Case	10	..	...	..	..	..	5	..	2	..	1	..	2	..	3
Catholic Univ.	1	..	...	..	..	..	1	..	..	..	..	..	..	..	...
Chattanooga	1	..	...	..	..	..	..	..	..	..	..	..	..	1	...
Chicago	2	..	...	..	..	1	..	..	..	..	..	..	1	..	2
Cincinnati	1	..	...	..	1	..	..	..	..	..	..	..	..	..	...
Colgate	1	..	...	..	..	..	..	..	..	..	..	..	1	..	...
Colorado College	1	..	...	..	..	..	..	..	..	..	1	..	..	..	...
Colorado Sch. Mines	1	..	...	..	..	..	..	1	..	..	..	..	..	..	...
Columbia	5	..	...	..	..	..	1	1	..	..	1	..	2	..	1
Cornell	21	..	...	..	..	6	..	..	..	..	10	1	..	4	4
Dartmouth	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Defiance	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Denison	1	..	...	..	..	..	..	..	..	..	..	..	1	..	...
Drake	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
Geneva	2	..	...	..	..	..	..	..	..	..	..	..	2	..	1
Georgia Tech.	7	..	5	..	..	..	..	..	..	1	..	..	1	..	2
Gettysburg	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Grinnell	1	..	...	..	..	..	..	..	..	..	..	..	1	..	1
Hamilton	1	..	...	..	..	..	..	..	..	..	..	..	1	..	1
Harvard	5	..	...	..	..	..	..	..	..	..	..	..	2	3	3
Heidelberg	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Illinois	66	13	46	..	..	2	..	..	..	..	1	1	2	1	12
Indiana	2	..	...	..	..	..	..	..	..	..	..	..	..	2	2
Inst. of Mines (?)	1	..	...	..	..	..	..	1	..	..	..	..	..	..	...
Iowa State	23	1	17	..	..	..	2	..	..	..	..	1	2	..	5
Iowa Univ.	1	..	...	..	..	..	..	..	..	..	..	..	1	..	1
Kansas Univ.	2	..	...	..	..	..	1	..	..	..	..	..	..	1	...
Kenyon	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Lehigh	5	..	...	..	..	1	2	..	..	1	1	..	..	..	1
Maine	1	..	...	..	..	..	1	..	..	..	..	..	..	..	...
Maryland	1	..	...	..	..	..	..	..	..	..	..	..	1	..	1
Mass. Inst. Tech.	21	..	1	..	..	..	11	..	..	2	2	1	4	..	7
McPherson	1	..	...	..	..	1	..	..	..	..	..	..	..	..	1
Michigan Univ.	9	..	...	..	..	2	4	..	..	..	1	..	..	2	1
Michigan State	1	..	...	..	..	..	..	..	..	..	1	..	..	..	...
Minnesota	5	..	...	..	..	1	2	..	..	..	1	1	..	..	1
Missouri Sch. Mines	10	1	7	..	..	..	..	1	..	..	..	..	..	1	3
Monmouth	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
Montana	1	..	...	..	..	1	..	..	..	..	..	..	..	..	1
Nebraska	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
N. C. State	8	..	8	..	..	..	..	..	..	..	..	..	..	..	2
N. C. Univ.	2	..	1	..	..	1	..	..	..	..	..	..	..	..	1
North Dakota	1	..	...	..	..	..	..	1	..	..	..	..	..	..	...
Northwestern	1	..	...	..	..	..	..	..	..	..	..	..	1	..	1
Oberlin	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
Ohio University	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Ohio State	131	2	116	..	2	..	7	..	..	..	2	..	1	1	23
Ohio Wesleyan	3	..	...	..	..	..	..	..	..	..	..	..	1	2	3
Oklahoma A. & M.	1	..	...	..	..	..	..	..	..	..	..	..	1	..	1
Penn State	15	4	4	..	..	1	3	..	..	1	..	..	2	..	5
Pennsylvania	4	..	...	..	..	1	2	..	..	..	..	1	..	..	1
Pittsburgh	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Pomona	1	..	...	..	..	1	..	..	..	..	..	..	..	..	1
Pratt Inst.	1	..	...	..	1	..	..	..	..	..	..	..	..	..	...
Princeton	4	..	...	..	1	1	..	..	..	..	..	..	..	2	...
Puget Sound	1	..	...	..	..	1	..	..	..	..	..	..	..	..	1
Purdue	3	..	...	..	..	..	1	..	..	..	1	1	..	..	1
Rensselaer Poly.	2	..	...	..	..	..	..	..	..	1	..	1	..	..	...
Rochester	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Rose Poly.	2	..	...	..	..	..	1	..	.	1	..	..	..	..	1
Rutgers	20	10	5	..	..	4	1	..	..	..	..	..	..	..	9
South (Univ. of)	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
S. D. Sch. Mines	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...

EDUCATIONAL TRAINING OF MEMBERS (NOT FELLOWS) (*concluded*)

College	No.	B.S. Ceramics	B.S. Ceram. Eng.	B.S. Glass Tech.	B.S. Applied Art	B.S. Chemistry	B.S. Chem. Eng.	B.S. Min. Eng.	B.S. Met.	E.E.	M.E.	C.E.	B.S.	A.B.	Higher Degrees
Southwestern	1	..	...	..	..	1	..	..	..	..	..	..	..	..	1
Stanford	2	..	...	..	..	1	..	1	..	..	..	..	..	..	...
Stevens Inst.	2	..	...	..	..	..	..	..	..	..	2	..	..	..	...
Swarthmore	1	..	...	..	..	1	..	..	..	..	..	..	..	..	1
Tri-State	1	..	...	..	..	..	..	..	..	..	1	..	..	..	...
Tulane	1	..	...	..	1	..	..	..	..	..	..	..	..	..	...
Union	1	..	...	..	..	..	..	..	..	..	..	..	1	..	...
Villanova	1	..	...	..	..	..	1	..	..	..	..	..	..	..	1
Virginia Poly.	3	..	...	..	..	1	..	..	..	..	2	..	..	..	1
Wabash	1	..	...	..	..	1	..	..	..	..	..	..	..	..	1
Washington	11	3	2	..	..	2	3	1	..	..	..	..	..	..	10
Washington & Lee	1	..	...	..	..	..	..	..	..	..	..	..	..	1	...
Wash. & Jeff.	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
Western Reserve	2	..	...	..	..	1	..	..	..	..	..	..	..	(D.D.S.)	1
West Virginia U.	2	..	...	..	..	..	2	..	..	..	..	..	..	..	1
West Va. Wesleyan	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Williams	1	..	...	..	..	1	..	..	..	..	..	..	..	..	...
Wittenberg	1	..	...	..	..	..	..	..	..	..	..	..	..	1	...
Wisconsin	4	..	...	..	..	1	2	..	..	..	1	..	..	..	2
Worcester Poly.	4	..	...	..	..	2	1	..	..	1	..	..	..	..	3
Yale	9	..	...	..	..	2	1	..	..	..	..	..	..	6	...
Manitoba	1	..	...	..	..	..	..	1	..	..	..	..	..	..	...
McMaster	1	..	...	..	..	..	..	..	..	..	..	..	..	1	1
McGill	2	..	...	..	..	..	..	..	..	1	..	1	..	..	1
Queens	2	..	...	..	..	1	1	..	..	..	..	..	..	..	...
Saskatchewan	3	..	...	..	..	..	2	..	..	..	..	..	1	..	1
Toronto	3	..	...	..	..	..	1	..	..	1	..	..	..	1	...
European	23	5	...	..	..	9	6	1	2	..	..	..	..	..	9
No name given	3	..	...	..	..	1	..	..	..	..	1	1	..	..	...
TOTAL	581	46	242	5	10	61	67	11	4	10	30	10	43	41	162

Percentages

7.92	41.6	.86	1.72	10.5	11.5	1.89	0.69	1.72	5.16	1.72	7.40	7.24	24.8

TOTALS (DEGREES)

B.S. Ceramics	B.S. Ceram. Eng.	B.S. Glass Tech.	B.S. Appl. Art.	B.S. Chemistry	B.S. Chem. Eng.	B.S. Min. Eng.	B.S. Met.	E.E.	M.E.	C.E.	B.S.	A.B.	Higher Degrees
7	35	5	5	10	9	4	2	1	13	1	21	11	32
15	80	..	..	12	23	2	..	3	7	4	14	12	46
16	125	..	5	16	15	2	..	3	6	3	6	7	51
8	2	..	..	23	20	3	2	3	4	2	2	12	32
Totals													
46	242	5	10	61	67	11	4	10	30	10	43	42	161

Attended College but received no degrees

	1 year	10
	2 "	4
	3 "	7
More than	3 "	10
		31
No collegiate training		38
TOTAL		69

PROPOSED AMENDMENTS TO THE CONSTITUTION*

Present

Article III

(1) The membership of THE SOCIETY shall consist of the following classes:

(1) (*d*) Members shall be persons interested in the ceramic or allied arts and sciences elected as provided in the By-Laws.

(2) The Board of Trustees may declare any Fellow, Member, or Corporation Member to be a Life Member in the same class of membership, in the manner and upon the conditions provided in the By-Laws.

(3) The following classes of members shall be entitled to vote on matters pertaining to THE SOCIETY as a whole or its regularly constituted Divisions: Fellow, Member, Voter of Corporation Member, and Life Member of these classifications.

(4) The following classes of members shall be entitled to hold office: Fellow, Member, and Life Member of either classification.

Article IV

(1) The management of the affairs of THE SOCIETY shall be vested in a Board of Trustees, consisting of the President of THE SOCIETY, the Vice-President, the Treasurer, the two most recent living Past-Presidents, and a representative of each Division of THE SOCIETY.

Present

(3) . . . . . The term of office of the Trustee representative of each Division shall be three years, to wit: . . . . .

(4) (*c*) To determine questions of jurisdiction arising between the various Divisions, Fellows, Local Sections, Student Branches, Committees, and other subdivisions and members of THE SOCIETY.

Article VII

(4) Each year the members of those Divisions whose Trustees' triennial terms expire at the forthcoming Annual Meeting shall, by plurality written vote more than thirty (30) days before the opening date of the said Annual Meeting, elect a representative. . . . .

(5) In the event of the refusal to act, or incapacity to act, of a Trustee representative of a Division, the members of such Division shall, by plurality written vote, elect a successor . . . . .

* See *The Bulletin* for June, 1936, page 200.

Proposed

Article III

(1) The membership of THE SOCIETY shall consist of the following grades:

(1) (*d*) Members shall be persons who meet certain standards and have been elected as provided in the By-Laws.

(1) (*e*) Associate Members shall be persons interested in the ceramic or allied arts or sciences and have been elected as provided in the By-Laws.

(Present Article III (1) (*e*) becomes Article III (1) (*f*) and subsequent sub-sections of Section (1) are relettered.)

(2) The Board of Trustees may declare any Fellow, Member, or Corporation Member to be a Life Member in the same grade of membership, in the manner and upon the conditions provided in the By-Laws.

(3) The following grades of members shall be entitled to vote on matters pertaining to THE SOCIETY as a whole or its regularly constituted Divisions: Fellow Members Associate Member, Voter of Corporation Member, and Life Member of these grades.

The following grades of members shall be entitled to vote on matters pertaining to the regularly constituted Classes of THE SOCIETY: Fellow, Member, Associate Member, and Life Member of these grades.

(4) The following grades of members shall be entitled to hold office: Fellow, Member, Associate Member, and Life Member of these grades.

Article IV

(1) The management of the affairs of THE SOCIETY shall be vested in a Board of Trustees consisting of the President of THE SOCIETY, the Vice-President, the Treasurer, the two most recent living Past-Presidents, a representative of each Class of THE SOCIETY, and a representative of each Division of THE SOCIETY.

Proposed

(3) . . . . . The term of office of the Trustee representative of each Class, and the term of office of the Trustee representatives of each Division shall be three years, to wit: . . . . .

(4) (*c*) To determine questions of jurisdiction arising between the various Classes, Divisions, Fellows, Local Sections, Student Branches, Committees, and other subdivisions of members of THE SOCIETY.

Article VII

(4) Each year the members of those Classes, and the members of those Divisions whose Trustees' triennial terms expire at the forthcoming Annual Meeting shall, by plurality written vote more than thirty (30) days before the opening date of the said Annual Meeting, respectively, elect a representative. . . . .

(5) In the event of the resignation, refusal to act, or incapacity to act, of a Trustee representative of a Class or Division, the members of such Class or Division shall, by Plurality written vote, elect a successor . . . . .

Article VIII—Classes

New

(1) Fellows, Members, and Associate Members may be grouped into Classes according to their training and experience as provided in the By-Laws.

(2) Each Class may elect officers and conduct business as provided in the By-Laws.

New

(Present Article VIII becomes Article IX and subsequent Articles are renumbered.)

Article XII

(3) Each Class shall appoint such members of general committees of THE SOCIETY as the By-Laws of THE SOCIETY may currently require, the manner of such appointment to be as provided in the Rules of each Class.

REASONS FOR PROPOSED CHANGES IN THE CONSTITUTION

Several of our committees, and more particularly the Committee on Education, the report of which appears on p. 121 in this issue of *The Bulletin*, have dealt with the status of the Ceramic Engineer with reference to State Examining Boards and the Engineer's Council for Professional Development. The problem was presented to the Board of Trustees by this Committee and also by the Education Committee of Keramos. It was felt that Ceramic Engineers were at a disadvantage, owing to the fact that the American Ceramic Society was unable, *per se*, to support them in the same manner that the several engineering societies supported their respective classes of engineers and that there was danger of Ceramic Engineering being considered a subbranch of some other recognized group.

It was recognized that the American Ceramic Society, made up as it is largely of Ceramic Technologists and Ceramic Artists as well as Ceramic Engineers, could not practically conform to the pattern recommended by E.C.P.D. and now being adopted by the engineering societies. It was further recognized that a separate organization of Ceramic Engineers was neither desirable nor practical. On the other hand, a group of members of the American Ceramic Society has petitioned the Board of Trustees for permission to form, within the Society, a group of Ceramic Engineers.

It was proposed, therefore, to provide authority in the Constitution of the Society so that any of the basic groups in our membership could form a semi-autonomous organization when and if it were desirable. Acting under instructions from the Board of Trustees, amendments to the Constitution are herewith submitted to the membership for discussion at the Annual Business Meeting, March 23, 1937, as provided in Article XIV.

These amendments provide for dividing the Society into "classes" of members, and calling what was formerly referred to as classes, "grades," that is, Fellow, Member, Corporation Member, etc. Each "Class" established by the Board of Trustees in the By-Laws would elect a Trustee to serve for three years. The Divisional set-up would not be changed by any of these amendments.

In order to permit the Ceramic Engineers to set up their "Class" in line with the recommendations of E.C.-P.D. for engineering societies, it is necessary to provide in the Constitution for a distinction between Members and Associate Members. The details of distinction will have to be developed by the respective "Classes." Differences of privilege, if any, would only apply in the "Class," since the Constitution, as amended, will provide for no such difference with respect to the affairs of the general Society.

—W. KEITH MCAFEE, *Chairman of Rules Committe*

NEW MEMBERS *

Corporation

BRICK MANUFACTURERS ASSOCIATION OF AMERICA, Harry C. Plummer (voter), 2121 Guarantee Title Bldg., Cleveland, Ohio

KRAFTILE COMPANY, C. W. Kraft (voter), Niles, Calif.

Personal

AUSTIN, HAROLD S., 3507 Sunset Drive, Flint, Mich.; foundry metallurgist, Buick Motor Co.

BAKER, HENRY W., "Triplex" Safety Glass Co., Ltd., King's Norton, Birmingham, England; technical and patents department.

CARTER, F. B., 39 Washington Ave., Tiffin, Ohio; general ceramic engineer, Standard Sanitary Mfg. Co.

CHAMBERS, J. FRED, Luckey, Ohio; sales manager, Central Industrial Div., National Gypsum Co.

CLAPPERTON, GEORGE P., Florida Ave., Chester, W. Va.; district commercial manager, Electric Utility Monongahela West Penn Public Service Co.

CRANE, ROBERT F., 220 Allegheny Ave., Kittanning, Pa.; efficiency engineer, Eljer Company.

* ERHARDT, RAYMOND K., Room 1101, 43 E. Ohio St., Chicago, Ill.; sales engineer, Industrial Incinerators, 2405—61st Ave., Cicero, Ill.

ERICKSON, HENRY W., 38-12 213th St., Bayside, L. I., N. Y.; vice-president and chief engineer, Separations Engineering Corp., 110 E. 42nd St., New York, N. Y.

* FISHER, GEORGE P., 520 E. Van Buren St., Ottawa, Ill.; Ottawa Silica Co.

FRANCK, L., Messrs. Franck & Steeman, Vitreous Enamel Mfgrs., 14 Avenue Emmanuel, Haren-Nord, Brussels, Belgium

HAEBERLE, Kr., Grodzisk Marzow, Poland; Dipl.-Ing.

HAHNER, CLARENCE H., 1802 Park Rd., Washington, D. C.; assistant technologist, Glass Section, National Bureau of Standards.

* Indicates former member of the Society rejoining for 1937.

* HEMSTEGER, SAMUEL E., 16033 Evanston Ave., Detroit, Mich.; ceramic engineer, Plumbing Ware Div., Briggs Mfg. Co.

KOCH, DANIEL O., E. I. du Pont de Nemours & Co., R. & H. Chemicals Dept., Wilmington, Del.

* MATTHEWS, SAMUEL, Ceramic Dept., Univ. of Saskatchewan, Saskatoon, Can.

MCCART, KENNETH C., 218 N. Crawford Ave., New Castle, Pa.; chemist, Universal Sanitary Mfg. Co.

MILLER, D. C. R., Duplate (Windsor) Ltd., Walker Road, Windsor, Ont., Canada; technical engineer.

TOWNSEND, LESLIE W., American Encaustic Tiling Co., Maurer, N. J.; ceramic engineer.

TWYMAN, WILLIAM G., 926 S. Olive St., Mexico, Mo.; ceramic engineer, A. P. Green Fire Brick Co.

*WAGNER, BRUCE F., 337 N. Longcommon Rd., Riverside, Ill.

WILDE, JOHN F., 2304 E. 52nd St., Los Angeles, Calif. president, Ha-Jo Tile & Pottery Co.

WULF, CHARLES A., P.O. Box 114, Indianapolis, Ind.; president and general manager, American Valve & Enameling Corp.

* Indicates former member of the Society rejoining for 1937.

Student

CLARK, EMORY W., Georgia School of Technology.

CLEEVES, GEORGE A., Pennsylvania State College.

GRACE, HOLT B., Georgia School of Technology.

JACKSON, ARTHUR W., Ohio State University.

KEY, JOSEPH B., Kansas State College of Agriculture and Applied Science.

KREITZER, JOHN E., University of Washington.

PALMER, RUFUS N., Massachusetts Institute of Technology.

POTTER, PAUL M., JR., Georgia School of Technology.

SCAVENS, M. J., Georgia School of Technology.

VADHANA, Suvan T., University of Michigan.

MEMBERSHIP WORKERS' RECORD

Corporation

Willi M. Cohn	1	Office	1

Personal

W. Astles	1	W. E. Palmer	1
C. E. Bales	1	W. Steger	1
J. R. Beam	1	W. E. S. Turner	1
R. S. Bradley	1	W. F. Wenning	1
G. E. Crawford	1	Office	12
G. W. Jarman, Jr.	1	Total	22

Student

J. L. Carruthers	1	Hewitt Wilson	1
Lane Mitchell	1	Office	5
J. G. Mohr	1		
F. H. Norton	1	Total	10
		Grand Total	**34**

ROSTER CHANGES DURING FEBRUARY*

Corporation

CORNING GLASS WORKS, MACBETH-EVANS DIV., H. H. Blau (voter), Charleroi, Pa. (Macbeth-Evans Glass Co.)

INTERNATIONAL SMELTING & REFINING CO., L. Grant Duncan (voter), White Lead Dept., Akron, Ohio. (F. O. Case (voter), East Chicago, Ind.)

NORTH STATE FELDSPAR CORP., 1403 Trenton Trust Bldg., Trenton, N. J. (Micaville, N. C.)

Personal

BROWN, WILBUR F., 2363 Scottwood Ave., Toledo, Ohio. (Charleston, W. Va.)

DEAR, PAUL S., Dept. of Ceramics, Pennsylvania State College, State College, Pa. (Blacksburg, Va.)

FACKT, GEORGE P., Gladding-McBean & Co., 2901 Los Feliz Blvd., Los Angeles, Calif. (San Francisco, Calif.)

FILIPPI, CHARLES R., 11406 Calumet Ave., Chicago, Ill. (Champaign, Ill.)

GUASTAVINO, RAFAEL, P.O. Box 1355, Fort Lauderdale, Fla. (Bay Shore, N. Y.)

MINTON, LEWIS, G., 3015 W. Commonwealth Ave., Alhambra, Calif. (Seville, Ohio)

MUNRO, R. ARCHIBALD, 2213 La Salle Ave., Niagara Falls, N. Y. (Lock Haven, Pa.)

NEWCOMB, REXFORD, JR., Industrial Publications, Inc., 59 E. Van Buren St., Chicago, Ill. (Detroit, Mich.)

RUSSELL, RALSTON, JR., General Ceramics Co., Keasbey, N. J. (Flint, Mich.)

SCHMUNK, LOUIS, Pandora, Ohio. (Brescia, Italy)

SKINNER, ROBERT (student), New York State College of Ceramics. (Attica, N. Y.)

SMITH, HILLARD A., General Ceramics Co., No. 2, Metuchen, N. J. (Perth Amboy, N. J.)

TAKAHASHI, K., Nippon Glass Co., 1 7-chome Ginza, Tokyo, Japan. (Hodogaya, near Yokohama)

TREES, JACK E., 1016 W. Broadway, Muskegon, Mich. (Detroit, Mich.)

TWELLS, ROBERT, Electric Auto-Lite Co., Plant No. 5, Spark Plug Div., Fostoria, Ohio. (Toledo, Ohio)

* Address in parentheses is the old address.

MEMBERSHIP STATUS

Date of Record	Members Paid		Deferred	Subscriptions	Monthly sales	Total circulation
	Personal	Corporation				
February 29, 1936	1352	186	61	496	225	2320
February 23, 1937	1579	210	19	515	220	2543

ANNUAL REPORTS OF LOCAL SECTIONS

CALIFORNIA SECTION

Five meetings were held during the year 1936 under the chairmanship of B. M. Burchfiel, with Thomas S. Curtis as Secretary.

The lowest attendance at any meeting was sixty-six members while the highest was one hundred and ten.

Technical subjects covered during the year were (1) a discussion of the dust hazard and silicosis, (2) a paper on the occurrence and refining of borax, and (3) a demonstration of the application of metal spraying as a means of salvaging parts of ceramic machinery.

Two social meetings were held, one of which was the annual "beer bust," sponsored by the materials and equipment people of the district; the other a visit to the Santa Catalina Island potteries where some of the most interesting California pottery is manufactured.

The executive policy of the California Section for a number of years has been to elect each year a vice-chairman with the intention of moving such vice-chairman up to the chairmanship the ensuing year. This policy provides for experience and guarantees continuity of effort and interest.

The secretaryship has been vested in one man for several years in order to maintain interest and to guarantee aggressive administration of the secretary's office.

In the opinion of the Executive Committee of the California Section, a long term secretaryship coupled with a deliberate grooming of the chairman has been responsible for the activity of this Section.

—T. S. CURTIS, *Vice-Chairman and Corresponding Secretary*

CHICAGO SECTION

The officers of the Chicago Section are as follows:

Chairman: G. G. Hanson, Consolidated Feldspar Corp., Chicago, Ill.
Vice-Chairman: George Arras, Quadrangle Mfg. Co., Chicago, Ill.
Secretary: H. V. Kaeppel, *Ceramic Industry*, Chicago, Ill.

This Section had a fairly active season featured by a number of interesting joint meetings with other groups. Perhaps the outstanding activity of the Section is its participation in the Annual Conference on Glass Problems instituted several years ago and held each spring at the Department of Ceramic Engineering, University of Illinois. This Conference has proved valuable and interesting and draws a large attendance of practical glass plant operators and technologists.

A joint meeting was held with the Chicago Section of the American Chemical Society, physicochemical group and, in October, the Section met with the Chicago District Enamelers Club, having as guest speakers Francis C. Flint, President of the American Ceramic Society, and Emerson P. Poste.

The annual golf tournament, also a feature of the Section's activities, was unusually successful.

Owing to the somewhat limited activity in ceramics in the Chicago district, with the exception of enamels, the Chicago Section has found the plan of holding joint meetings with other related groups very successful and a means of stimulating interest.

—H. V. KAEPPEL, *Secretary*

BALTIMORE-WASHINGTON SECTION

The officers of this section are as follows:

Chairman: C. H. Hahner, National Bureau of Standards, Washington, D. C.
Vice-Chairman: G. H. Spencer-Strong, Porcelain Enamel and Mfg. Co., Baltimore, Md.
Secretary-Treasurer: G. R. Shelton, National Bureau of Standards.
Councillor: Royden A. Blunt, Buck Glass Co., Baltimore, Md.

There are one-hundred and sixteen members of this Section. The annual dues are one dollar. There were four meetings in 1936.

The January meeting was held in Baltimore. Nelson W. Taylor, Department of Ceramic Engineering, Pennsylvania State College, gave an illustrated talk on "Chemical Reactions in the Solid State."

At the March meeting in Washington, J. C. Hostetter, Director of Research at Corning Glass Works, discussed "New Developments in Glass as an Engineering Material." The discussion was illustrated with lantern slides, moving pictures, and laboratory demonstrations.

Anson Hayes, Director of Research, American Rolling Mill Co., presented a paper on "Research in the Iron and Steel Industry" at the May meeting in Baltimore. Several reels of film were used to show new processes in the industry.

The fall meeting was held in conjunction with the meeting of the Art Division of the American Ceramic Society in Baltimore on October 30 and 31. A committee from the Section assisted in making the occasion a success by preparing notices for the local papers, both in Baltimore and Washington, and also in arranging trips to museums and private collections of ceramic art.

—G. R. SHELTON, *Secretary*

CENTRAL OHIO SECTION

The officers* of the Section are as follows:

Chairman: C. R. Austin, Battelle Memorial Institute, Columbus, Ohio
Secretary: M. C. Shaw, Edward Orton, Jr., Ceramic Foundation
Programs: J. O. Everhart, Ohio State Univ. Engineering Expt. Station, Columbus, Ohio
Councillor: John L. Carruthers, Dept. of Ceramic Engineering, Ohio State Univ., Columbus, Ohio

There are one hundred active members in this Section. There are no dues; active membership in the American Ceramic Society, however, is required.

* Officers for 1937–38 have been elected and are listed on p. 130, this issue.

During the past year, four meetings were held at which technical papers were given. There was an average attendance of fifty active members and ten visitors.

The speakers and their subjects for the four meetings are as follows:

(1) February 3: H. E. Simpson, Battelle Memorial Institute, "Trends in Refractory Slag Tests."

(2) March 16: H. C. Shetrone, Director and Archeologist, Ohio State Univ. Museum, "Aboriginal Pottery and Pottery Making."

(3) May 1: R. B. Sosman, United States Steel Corp., "Pyrometric Cones and the Measurement of High Temperatures."

(4) June 2: H. C. Weller, Surface Combustion Corp., "Application of Radiant-Tube Firing to Ceramics."

All of these meetings with the exception of the one at which Mr. Shetrone spoke were held in the auditorium in the Battelle Memorial Institute. Mr. Shetrone delivered his paper at the Ohio State Archeological Museum.

In addition to these meetings, Dr. and Mrs. Purdy entertained the Section at a social meeting in March at the offices of the American Ceramic Society for the purpose of formulating plans for the Annual Meeting of the American Ceramic Society which was held in Columbus, Ohio, and in which the Local Section took an active part in arranging and carrying out.

—Myril C. Shaw, *Secretary*

MICHIGAN-NORTHWESTERN OHIO SECTION

The officers of the Section are as follows:

Chairman: Macon Trabue, Mt. Clemens Pottery Co., Mt. Clemens, Mich.
Vice-Chairman: Thomas Place, Mt. Clemens Pottery Co.
Secretary-Treasurer: Karl Schwartzwalder, A C Spark Plug Division, General Motors Corp., Flint, Mich.

The following meetings were held in 1936:

January 17, 1936: Turnverein Inn, Detroit, Mich. Election of officers and motion pictures, "The Potters Wheel" and "Electric Heat in Industry."

March 13, 1936: Media Hotel, Mt. Clemens, Mich. Speaker: N. E. Stewart, Wayne Univ., "Some Aspects of American Pottery."

May 22, 1936: Jackson, Mich Trip through the Macklin Co. plant. Speakers: W. V. Blake, Macklin Co., and Russel W. Ehlers, A C Spark Plug Div., General Motors Corp.

September 18, 1936: Stag Party, St. Clair Shores, Mich.

November 20, 1936: Cranbrook Academy, Bloomfield Hills, Mich. Speaker: R. Guy Cowan, Onondaga Pottery Co., Syracuse, N. Y., "Ceramic Art and Sculpture."

The following meetings are scheduled for 1937:

January 15, 1937: Durant Hotel, Flint, Mich. Speaker: F. C. Flint, Hazel-Atlas Glass Co., "How to Kill an Evening."

February 26, 1937: Media Hotel, Mt. Clemens, Mich. Speaker: Ross C. Purdy, Secretary, American Ceramic Society, "Value of a Ceramic Education"; election of officers.

May 14, 1937: Detroit, Mich. Speaker: A. V. Bleininger, Homer Laughlin China Co., Newell, W. Va.

—Karl Schwartzwalder, *Secretary-Treasurer*

ANNUAL REPORTS OF STUDENT BRANCHES

GEORGIA SCHOOL OF TECHNOLOGY

At a meeting held on October 21, 1936, the Georgia Tech Student Branch of the American Ceramic Society was re-organized. The following officers were elected: *President*, John Napier; *Secretary and Treasurer*, Paul Potter; and *Program Chairman*, E. K. Alexander.

The following is a list of the members of the Student Branch: R. E. Camp, E. W. Clark, H. B. Grace, D. L. Nowell, C. H. Pitts, P. M. Potter, J. M. Teague, and R. B. Williams, who are sophomores. J. R. Napier and J. E. Watters, seniors; V. J. Warthen and T. J. Cater, graduate students; and E. K. Alexander, a junior. Honorary members include W. H. Vaughan, Lane Mitchell, and Mitchell Simmons.

At the first meeting it was decided to have society meetings every other Wednesday night at 7 o'clock. At this meeting a project of making souvenir book ends for the players of the California and Tech teams was discussed and passed upon. The work on this project went forward rapidly under the direction of L. A. Tedder, departmental technician. The members of the sophomore class had much to learn about the science of casting, glazing, and finishing clayware; all pitched in with a will, however, and many hands made light work of it. The book ends were biscuit-fired, glazed white, and the lettering "MERRY XMAS —CALIFORNIA—GA. TECH—1936," was glazed in gold. The finished article was quite beautiful as well as serviceable, and the department was proud to be able to present them to the members of the teams. All feel that they have gained quite a bit through actual experience in manufacturing a ceramic product. This Student Branch is proud to announce the successful completion of its first project.

At the time of organization, there was only one student member of the American Ceramic Society in the department. At present there are four members, with probabilities of others before the term is over. Our meetings have been interesting and instructional, and in the future it is planned to have talks from men working in some ceramic field.

In closing I should like to request, on behalf of the Student Branch, the appointment of W. H. Vaughan as our councillor.

—Paul Potter, *Secretary*

IOWA STATE COLLEGE

The Fall Quarter of 1936 is now laid by as history, and 1937 presents itself as an opportunity for the ceramic students at Iowa State College to accomplish greater achievements. The enrollment for the Winter Quarter has been increased by three, thus yielding a little more powerful body with which to work.

The following officers have been elected for the current school year: *President–Vice-President*, Jack Flemming; *Secretary-Treasurer*, Ralph Grothusen; *Program Chairman*, M. E. McHardy; *Corresponding Secretary*, Bill Fluallen; *Veishea Chairman*, H. W. Drake.

With 1937 getting under way, the whole group is preparing plans for its annual Open House during Veishea, which takes place during the early part of May.

—RALPH GROTHUSEN, *Secretary*

MISSOURI SCHOOL OF MINES

The Orton Society, a junior branch of the American Ceramic Society, chose for its officers, *President*, M. E. Terryl; *Vice-President*, M. E. Green; and *Secretary-Treasurer*, K. F. Sheckler.

This Society has been active so far this school year and has plans for increased activity for the remainder of the term.

The students in the Ceramic Department were the guests of Professor Dodd at a luncheon held in commemoration of Orton Day, October 8. After the luncheon, the life of General Edward Orton, Jr., was read and some inspiring talks were made by the professors and the students.

In order that the students in other branches of Engineering at M. S. M. might more fully appreciate the importance of the ceramic industries, the Orton Society was instrumental in obtaining a motion picture from the A. P. Green Fire Brick Company of Mexico, Mo. The operations in an up-to-date refractories plant were shown in detail by this picture.

The program was well received by a large percentage of the student body and served to impress them with the importance of the ceramic industries.

In keeping with the modern trend of scientific investigation, the Ceramic Department of M. S. M. is to have a new X-ray laboratory. Plans have been approved, equipment ordered, and construction has been started for this new addition. The laboratory and installation of equipment will be completed before the middle of February. This addition supplies the Ceramic Department with complete petrographic and X-ray facilities.

—K. F. SHECKLER, *Secretary and Treasurer*

NEW YORK STATE COLLEGE OF CERAMICS

The Student Branch at this University is enjoying an active year under the leadership of the following officers: *President*, Edward Kunzman; *Vice-President*, Robert Skinner; *Treasurer*, Roland Tucker; and *Secretary*, Robert Doran.

Monthly meetings are held at which time some man outstanding in a field of ceramics delivers an address. The average attendance is about 150. During the past half school year, the Society has had the pleasure of hearing such prominent men as Louis Navias of the Ceramic Research Laboratory, General Electric Company; A. I. Andrews, University of Illinois; and E. W. Knapp, consulting engineer of the Bonnot Company. Future speakers include G. W. Morey, Geophysical Laboratory, Washington, D. C., and H. Ries, Head of the Geology Department of Cornell University.

Under the guidance of the senior members, preparations are being made for the Annual St. Pat's Celebration to be held March 18 and 19. This affair is the most outstanding social function of the year at Alfred University. The Open House at the Ceramic College has grown to be a high spot of the two-day celebration, being attended by hundreds of people from the nearby towns. The week following the celebration all of the Senior members and some of the under-classmen are planning to attend the Annual Meeting of the American Ceramic Society.

—ROBERT DORAN, *Secretary*

Additional Notes

Three hundred and twenty-six students are enrolled in the New York State College of Ceramics at the present time. This enrollment is about equally divided between the departments of General Ceramic Technology and Engineering, Glass Technology, and Ceramic Art. The enrollment is kept down to this figure by accepting only those applicants whose scholastic records in high school indicate that they have more than average ability and adaptability to the course.

One interesting feature of the present enrollment is the large number of students from families prominently identified with the ceramic industry.* They are as follows: Philip W. Tefft, Claycraft Manufacturing Co.; Howard Cowan, Onondaga Pottery Co.; Olaf Loytty, Corning Glass Works; Wm. J. Frey, Carr China Co.; James Wilson, Buffalo Pottery Co.; Van Derck Fréchette, Canadian Department of Mines; Walter Blundred, Onondaga Pottery Co.; Cameron Paulin, Sovereign Pottery Co.; William Knapp, Bonnot Co.; Addison Scholes, N. Y. S. College of Ceramics; Allan Wilson, Buffalo Pottery Co.; Herman Schrickel, Corning Glass Works; Norman Echavarria, Loceria Colombiana, Colombia, South America; and Herman Castro, Castro Oliviero Ceramica, Santiago, Chile, South America.

The employment situation is such as to indicate a shortage of ceramic graduates in the near future. Recent employment of graduates of this institution includes the following: J. Eugene Deegan, Glen Gary Brick Co.; Joseph Sarandria, Joseph Dixon Crucible Co.; Russell Miller, Refractories and Insulation Corp.; and Robert Childs, Corning Glass Works.

Research is being emphasized this year. The establishment of a department of research has furnished the necessary facilities. That department is now in full operation with H. G. Schurecht, J. F. McMahon, and C. Major Lampman devoting all of their time to research. The progress of their work is reported monthly to the ceramic industries. Two industrial fellowships are now in operation and they effectively supplement the work of the Department of Research.

The annual Christmas Festival was held on December 11 with its usual exhibit of pottery made by students.

PENNSYLVANIA STATE COLLEGE

The Pennsylvania State Student Branch has an active membership of twenty-eight undergraduates, and fourteen associates, including nine graduate students and five faculty members. Several of this group are members of

* A photograph of these students was published in *The Bulletin*, **16** [2] 75 (1937).

the American Ceramic Society. The officers for the current year are *President*, Mervin A. Fay; *Vice-President*, Donald Smith; *Secretary-Treasurer*, George A. Cleeves; *Adviser*, Nelson W. Taylor.

Several technical meetings have been held this year. Some of the men who have spoken at these meetings are F. C. Flint, President of the American Ceramic Society; Ross C. Purdy, General Secretary of the American Ceramic Society; John Maddock of Paper Makers, Inc., Easton, Pa.; N. W. Taylor and W. Weyl of the staff of the ceramics department; and Marvin O. Lewis, an undergraduate who spent the 1935–36 school year as an exchange student at Lingnan University in China. In addition to these meetings, Penn State was host to the Fall Meeting of the Materials and Equipment Division which was held in conjunction with the meeting of the Industrial Minerals Division (nonmetallic) of the American Institute of Mining and Metallurgical Engineers.

The meetings have been varied in character. One dinner meeting has been held and several other social meetings are being contemplated. Speakers have been chosen from different fields of the work. For the remainder of the year a similar plan of meetings will be in effect.

The Student Branch sponsored a field trip to Clearfield, Pa., where the members were shown through the firebrick plant of the Harbison-Walker Refractories Company.

—MERVIN A. FAY, *President*

UNIVERSITY OF ILLINOIS

The University of Illinois chapter of the Student Branch of the American Ceramic Society presents the following list of activities in which it has taken part during the first semester, 1936–37.

The names of the present officers are as follows: *President*, Floyd Hummel; *Vice-President*, Melvin Combs; and *Secretary-Treasurer*, Allen Porter.

On October 5, 1936, an informal smoker was held to which freshman and sophomore ceramic students were invited. A total of 59 undergraduate students listened to Professors Parmelee, Hursh, and Andrews give talks on the advantages and the activity of this Student Branch. Smokes were passed around in enameled containers.

The first regular meeting of the year was held on October 8, 1936, and an effort was made to fix the date of succeeding meetings so the majority of members would be able to attend. A student was appointed to cover the Student Branch meetings for the *Technograph*, the U. of I. Engineering college magazine. G. L. Clark of the U. of I. chemistry department gave the talk of the evening on "What the ceramist should know about X-rays." His talk was illustrated with slides. Eighty members were present. Cake and chocolate milk were served as refreshments.

To show that more than ordinary enthusiasm in the 1937 Student Branch prevailed, 115 members attended the meeting of October 28, 1936, to hear F. C. Flint, President of the American Ceramic Society. Professor Parmelee introduced the speaker, after which President Flint gave an illustrated talk on the serious and amusing aspects of the recent Glass Conference held in London. Taffy apples served as refreshment. A Committee was appointed to arrange for a Student Branch dance.

On November 18, 1936, a student speaker program was conducted by four of the students in the Department who had been employed during the past summer in the ceramic industry. C. R. Filippi gave a talk, illustrated with slides on the stove kilns of the Illinois Brick Co. Edward Dietterle spoke for the American Stove Co. Charles Wright described his duties with the Robinson Clay Products Co. Walter Senteres concluded the program by relating his experiences at A. P. Green Fire Brick Co. The date of the department dance, the "Ruckus," was set for January 9, 1937. Plans for a department basketball team were made.

The first thing to be done at the meeting of December 16, 1936, was the appointment of a Yearbook Committee. Wm. W. Coffeen, who had summer experience with the Canton Stamping & Enameling Co., gave a talk on "Adventures of a newly graduated enameler," after which Professor Andrews showed moving pictures taken on the recent senior inspection trip.

In an attempt to promote greater social activity within the Department, the Student Branch held the first annual "Ceramic Ruckus" dance in the Social Center. Students working under the direction of F. A. Petersen, chairman of the dance committee, made special enameled copper programs.*

Another new feature in the department this year is "Raw Materials," the voice of the Student Branch. It may be best described by the following write-up which it received in the *Daily Illini*.

"Raw Materials" Publishes "Gab" about Ceramists

"If you are walking down the hall of the Ceramics building on a Monday morning, you might wonder why everybody is gathered around the bulletin board. The object of such concentrated attention is not an exam schedule or an announcement pertaining to ceramics; it is "Raw Materials."

"'Raw Materials" is the department gossip sheet, published by the Student Branch of the American Ceramic Society, and placed on the bulletin board every Monday. The paper spares no one in giving out any personal news and therefore its contents are read anxiously by all members of the department, student and instructors alike.

"The paper is edited on a rotating plan, two different members of the Branch having charge of it each week, thus giving everyone an opportunity to insert anything he knows concerning anyone else and also to defend himself."

The final meeting of the semester was held on January 20, 1937. L. Barrett, holder of an Oxford University diploma and a graduate student in the department, gave an interesting exposition not only of ceramic education but of general education in England. The title of his talk had been advertised as "English Ceramics," thus giving the Britisher an opportunity to say in his first sentence that he did not know much about "twisted ceramics," Webster defining the word English as that which makes a billiard ball execute peculiar curvilinear motion.

—FLOYD HUMMEL, *President*

* EDITOR'S NOTE: One of the enameled copper "Ceramic Ruckus" dance programs has been made a part of the permanent exhibit in the offices of the American Ceramic Society.

OFFICERS of the AMERICAN CERAMIC SOCIETY for 1936-37

TRUSTEES*

President: F. C. Flint, Hazel-Atlas Glass Co., Zanesville, Ohio
Vice-President: R. B. Sosman, United States Steel Corp., Kearny, N. J.
Treasurer: H. B. Henderson, H. B. Henderson Co., East Liverpool, Ohio
Secretary-Editor: Ross C. Purdy, 2525 North High St., Columbus, Ohio
Past-President: J. M. McKinley, North American Refractories Co., Cleveland, Ohio (1938)
Past-President: W. K. McAfee, Universal Sanitary Mfg. Co., New Castle, Pa. (1937)

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Art: F. H. Rhead, Homer Laughlin China Co., East Liverpool, Ohio (1937)
Enamel: W. C. Lindemann, A. J. Lindemann & Hoverson Co., Milwaukee, Wis. (1937)
Materials and Equipment: G. H. Brown, Rutgers Univ., New Brunswick, N. J. (1939)
Refractories: C. E. Bales, Ironton Fire Brick Co., Ironton, Ohio (1937)
Structural Clay Products: J. L. Child, Hancock Brick & Tile Co., Findlay, Ohio (1939)
Terra Cotta: J. L. Carruthers, Ohio State Univ., Columbus, Ohio (1939)
White Wares: P. D. Helser, General Ceramics Co., New York, N. Y. (1939)

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Associate Dean: M. C. Booze, Chas. Taylor Sons Co., Cincinnati, Ohio
Secretary: G. H. Brown, Rutgers Univ., New Brunswick, N. J.

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*Date of expiration of term of office in parentheses.

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Management		F. B. Mahoney		R. R. Robinson				
Statistics				K. E. Ward				

* For complete list of Standards Committee appointments see p. 131.

Editorial and Advertising Offices:
The American Ceramic Society, 2525 North High St., Columbus, Ohio

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R. Guy Cowan, Onondaga Pottery Co., Syracuse, N. Y.
R. F. Sherwood, United Feldspar Corp., New York, N. Y.
T. A. Klinefelter, National Bureau of Standards, Washington, D. C.
R. C. Purdy, 2525 North High St., Columbus, Ohio

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Rules

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J. W. Whittemore, Virginia Polytechnic Inst., Blacksburg, Va.
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Wilber Stout, State Geologist, Columbus, Ohio

Data

Chairman, F. P. Hall, Onondaga Pottery Co., Syracuse, N. Y.

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George A. Bole, Lord Hall, O.S.U., Columbus, Ohio
Ellis Lovejoy, 480 West Sixth Ave., Columbus, Ohio

(B) Raw Materials Specifications

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T. A. Klinefelter, National Bureau of Standards, Washington, D. C.
S. M. Phelps, Mellon Institute, Pittsburgh, Pa.

(C) Tests*

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W. H. Pfeiffer, Frigidaire Corp., Dayton, Ohio
W. C. Taylor, Corning Glass Works, Corning, N. Y.
G. H. Brown, Rutgers Univ., New Brunswick, N. J.
R. S. Bradley, A. P. Green Fire Brick Co., Mexico, Mo.
J. O. Everhart, Engineering Experiment Station, O.S.U., Columbus, Ohio
A. H. Fessler, A C Spark Plug Co., Flint, Mich.

(D) Products*

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H. H. Blau, MacBeth-Evans Div., Corning Glass Works, Charleroi, Pa.
C. W. Gerster, Louthan Mfg. Co., East Liverpool, Ohio
E. H. Van Schoick, Chicago Retort & Fire Brick Co., Ottawa, Ill.
H. D. Foster, National Fireproofing Co., Haydenville, Ohio
A. H. Fessler, A C Spark Plug Co., Flint, Mich.

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H. E. White, Zelienople, Pa.
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Patent (temporary)

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---

* Indicates that members of these committees are Division appointees, and are listed in Division alphabetical rotation.

Appointed Representatives for 1936-37

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(*1*) *Sectional Comm. on Minimum Requirements for Plumbing and Standardization of Plumbing Equipment, A-40:* P. D. Helser, General Ceramics Co., New York, N. Y.
(*2*) *Committee C-29:* D. H. Rowland, Locke Insulator Corp., Baltimore, Md.
(*3*) *Committee on Safety Code, Safety Glass:* A. E. Marshall, 501 Fifth Avenue, New York, N. Y.
(*4*) *Committee Z-10, Letters, Symbols, and Abbreviations:* L. E. Barringer, General Electric Co., Schenectady, N. Y.

American Society for Testing Materials

(*1*) *Committee C-8:* N. W. Taylor, Pennsylvania State College, State College, Pa.
(*2*) *Committee E-1:* F. H. Norton, Massachusetts Inst. of Technology, Cambridge, Mass.
(*3*) *Committee A-1:* H. F. Staley, Metal & Thermit Corp., New York, N. Y.
(*4*) *Committee C-14 Glass and Glass Products:* J. C. Hostetter

American Society of Mechanical Engineers

(*1*) *Petroleum Div.:* H. R. Straight, Straight Engineering Co., Adel, Iowa
(*2*) *Process Div.:* W. K. McAfee, New Castle, Pa.

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(*2*) *Div. of Chemistry and Chemical Technology:* J. C. Hostetter, Hartford-Empire Co., Hartford, Conn.

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A. S. Watts, Columbus, Ohio

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R. A. Miller, Pittsburgh Plate Glass Co., Pittsburgh, Pa.
R. R. Shively, B. F. Drakenfeld & Co., Washington, Pa.
A. N. Finn, National Bureau of Standards, Washington, D. C.

International Union of Chemistry

Alexander Silverman, Univ. of Pittsburgh, Pittsburgh, Pa.

American Association for the Advancement of Science

M. E. Holmes, N. Y. State College of Ceramics, Alfred, N. Y.

International Congress on Glass and Ceramics

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O. I. Chormann, Pfaudler Company, Rochester, N. Y.
J. C. Hostetter, Hartford, Conn.
L. H. Milligan, Norton Company, Worcester, Mass.

NOTES AND NEWS

NATIONAL ACADEMY OF SCIENCES ANNUAL MEETING

The stated Annual Meeting of the National Academy of Sciences for the year 1937 will be held in Washington on April 26, 27, and 28.

Members of the National Research Council are cordially invited to attend the scientific sessions of the Meeting, which will occur on the forenoons and afternoons of Monday and Tuesday, April 26 and 27, 1937.

—F. E. WRIGHT, *Home Secretary*

BAUSCH & LOMB'S NEW LABORATORY FOR APPLIED RESEARCH

At a cost of approximately $40,000 and a 50% increase in its staff of graduate chemical engineers and metallurgists, Bausch & Lomb has opened a new laboratory for applied research.

Bausch & Lomb will engage in a broad program of fundamental investigations on the chemistry and physics of glass surfaces and in the development of new materials and processes for the industry.

Real advancement has been made in the perfection of cements for optical purposes; in the study of abrasives and polishing materials for optical glass; and in the investigation of the chemical and physical reactions on glass surfaces, induced by industrial gases, corrosive atmospheres and other atmospheric conditions. Further studies on these and many other subjects are planned.

Closely allied with this department is the laboratory for spectrographic analysis. In addition to testing spectrographic equipment built for laboratories in the United States, the application of spectroscopy to industrial problems, particularly in the field of metallurgy and ceramics, has been recognized as an indispensable requirement. With the facilities of the new laboratory, the Company will assist industry in the solution of problems in which spectroscopy is important.

MUSEUM VISITORS MAKE OWN COLOR EXPERIMENTS

Visitors to the New York Museum of Science and Industry in the RCA Building, Rockefeller Center, are learning about color by making experiments of their own with polariscopes and cellophane.

AT THE ANNUAL MEETING YOU WILL BE HAPPY TO MEET OSCAR OF THE WALDORF

There is no more famous name or outstanding personality in the hotel business of the whole world than "Oscar of the Waldorf." For years his name has been almost synonymous with the Hotel and its hospitality. For practically all of his business life he has been so intimately identified with the Waldorf-Astoria, a mention of the word "Waldorf" (it makes no difference whether the old Waldorf, or the present new Waldorf is referred to), and one almost automatically thinks of "Oscar," too.

Oscar was born in Locle, Canton de Neuchatel, Switzerland, in 1866. His first jobs were in confectionery and pastry establishments. He attended school at Chau-de-Fonds and Fribourg, the home of the first suspension bridge, and it is a coincidence that he came to this country in May, 1883, the day before the opening of the Brooklyn Bridge. It was his determination to become a citizen. So intent was he on this that barely an hour after his arrival he applied for naturalization.

The very day he landed in America he also applied for his first position. It was at the Brunswick. There was nothing available, so he tried the old Hoffman House, at 26th Street and Broadway, then one of America's most famous hostelries. There he was successful and he secured his first position in the hotel business at five o'clock on the day of his arrival in the United States! He was a busboy—and proud of it. He was soon so good at his work as to command attention and so was promoted to floor waiter. Young Oscar's good-naturedness and affability proved invaluable assets to the skillful young waiter and his friends —many of them influential ones—rapidly increased in number and in liking for him.

Oscar realized that in his friends he was creating a great asset. He will tell you now that without them his unique success would have been quite impossible. He made friends by being friendly, by pleasing his patrons, and winning their regard for his determination to please them. Pleasing them, they were pleased with him.

Mr. Stokes, the proprietor of the Hoffman House, took a great liking to the Swiss lad and frequently placed Oscar in charge of provisioning and staffing his yacht for cruises. Wealthy patrons, also placed Oscar in charge of private parties in their homes or at the hotel. Oscar, insisting on learning everything about hotels through personal experience, sought other assignments. He served in the receiving department, then as a steward. He was a checker. He studied bookkeeping and in time went through every possible job that could yield the knowledge of the hotel business—particularly of catering—which he craved.

After several years with the Hoffman House, Oscar transferred to Delmonico's, New York's most famous restaurant, at the turn of the century. He was determined to discover how the best-known restaurant of the day was run. After serving two years as a waiter, he was promoted to catering manager and arranged the outside banquets and social events handled by Delmonico's. In a short time he became manager of all the private room and outside catering. He was rapidly climbing the ladder of local fame. Oscar had created a name for himself, and that name, just "Oscar," became a very familiar one among the town's epicures.

Then came the new Waldorf. It was to be the last word in luxury and hotel facilities. George Boldt, the proprietor, was preparing to open this wonderful new hotel, of which so much was expected, early in 1893. He had everything at stake and, naturally, selected assistants with the utmost care. He was a great "stickler" for business proprieties and always required formal letters of reference. Oscar determined to give him one that would command his attention, and produced a letter of recommendation, the like of which Mr. Boldt had never seen. It was of ten pages, on foolscap, signed by so many famous New Yorkers that Mr. Boldt at once made up his mind that he had found the very man to command his restaurants and the great catering business of the new Waldorf. Among those who signed Oscar's record-breaking letter of recommendation were John W. Mackay, Chief Justice Andrews, Hamilton McK. Twombly, Dr. Seward Webb, George Gould, and many other famous men of the day; in fact, men whose names even now are instantly recognized as leaders.

At the time he joined The Waldorf, Oscar felt (and he soon proved it) that he had found just what he needed to make the best out of his genius for catering and extraordinary qualities as a host. He soon numbered among his friends and acquaintances not only the outstanding personalities of the life of New York City, but he rapidly acquired an international coterie of friends such as very few men have ever enjoyed, embracing as they do the leaders of society, of business, of the diplomatic circles, and even of royalty.

For over forty-two years Oscar has acted as host to the guests at the Waldorf, and distinguished indeed have been many of those he has greeted. He has welcomed to the Waldorf-Astoria at 34th Street, every President of the United States, commencing with President Cleveland, until the old house closed. And he greeted President Hoover, the first President of the United States to visit the new Waldorf-Astoria.

Oscar has been decorated by three governments. When Prince Carol of Roumania, now King, visited the United States in 1920, he pinned the Order of the Crown of Roumania upon Oscar's breast. France sent him a medal, bestowing upon him the title of Chevalier of the Ordre Merite Agricole. Another award came from the late Albert I, King of the Belgians, during his visit in 1919, who conferred on him the medal of the Order of the Crown.

As the official Host of The Waldorf, he has greeted the Prince of Wales; Prince Henry of Prussia; the late Viceroy of China, Li Hung-Chang; the Spanish Duke of Veragua; the late Theodore Roosevelt; the late President Taft; the late Governor Flower of New York; and, since the opening of the new Waldorf he has greeted President and Mrs. Franklin D. Roosevelt, former President and Mrs. Herbert Hoover, the King and Queen of Siam, General Italo Balbo and the Royal Italian flyers, Premier Pierre Laval of France, Marshal Petain of France, General Pershing, Maharajah of Burdwah, Winston S. Churchill, Maharajah

of Indore, William Waldorf Astor, son of Lord and Lady Astor; Mrs. Alice Hargreaves, who was the inspiration for the "Alice" of Lewis Carroll's Alice in Wonderland; His Highness Rana Bhagat Bahadur, Raja of Jubbal, and her Highness Rani Leilaba of Jubbal; H. R. H., Prince Aimone de Savoia, Duke of Spoleto, and cousin of the King of Italy; Ex-Premier Edouard Herriot of France; Professor Auguste Picard; former Prime Minister Ramsay MacDonald of England; and every so many more.

He is still greeting distinguished guests day after day—and continues to guide the gastronomic destinies of the Waldorf-Astoria, as it is hoped he will do for many years to come.

Oscar and Mrs. Tschirky celebrated their 48th wedding anniversary on September 18, 1936, last, and Oscar his 69th birthday anniversary on September 28, 1936.

Throughout his life Oscar of the Waldorf has upheld the following principles, inculcated by his father:

Always Play Fair and Square with Your Fellow Man—Never Doing Anything to Injure Him. . . . . Look Every Man Straight in the Eye. Be Faithful to Your Employer.

A record to be proud of, an inspiration to the young men who are coming into the business and seek its high places. A man who has so served the institution which he loves and which is his pride that he has become truly a part of it.

Oscar has a son engaged in manufacture of refractories.

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Presented to the American Ceramic Society by Samuel Geijsbeek, January, 1937.

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The October, 1936, number contains 27 other papers presented at the Congress.

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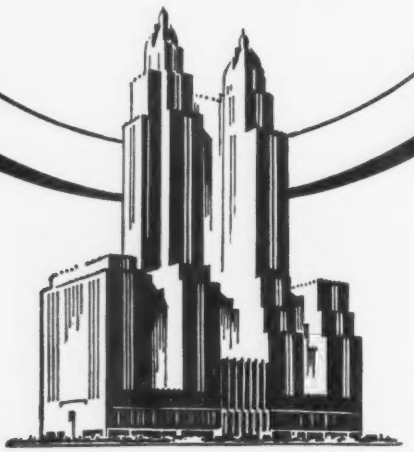

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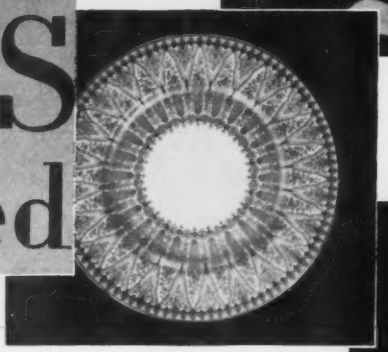

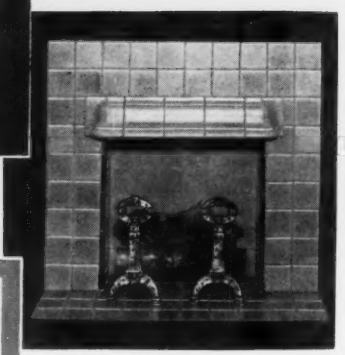

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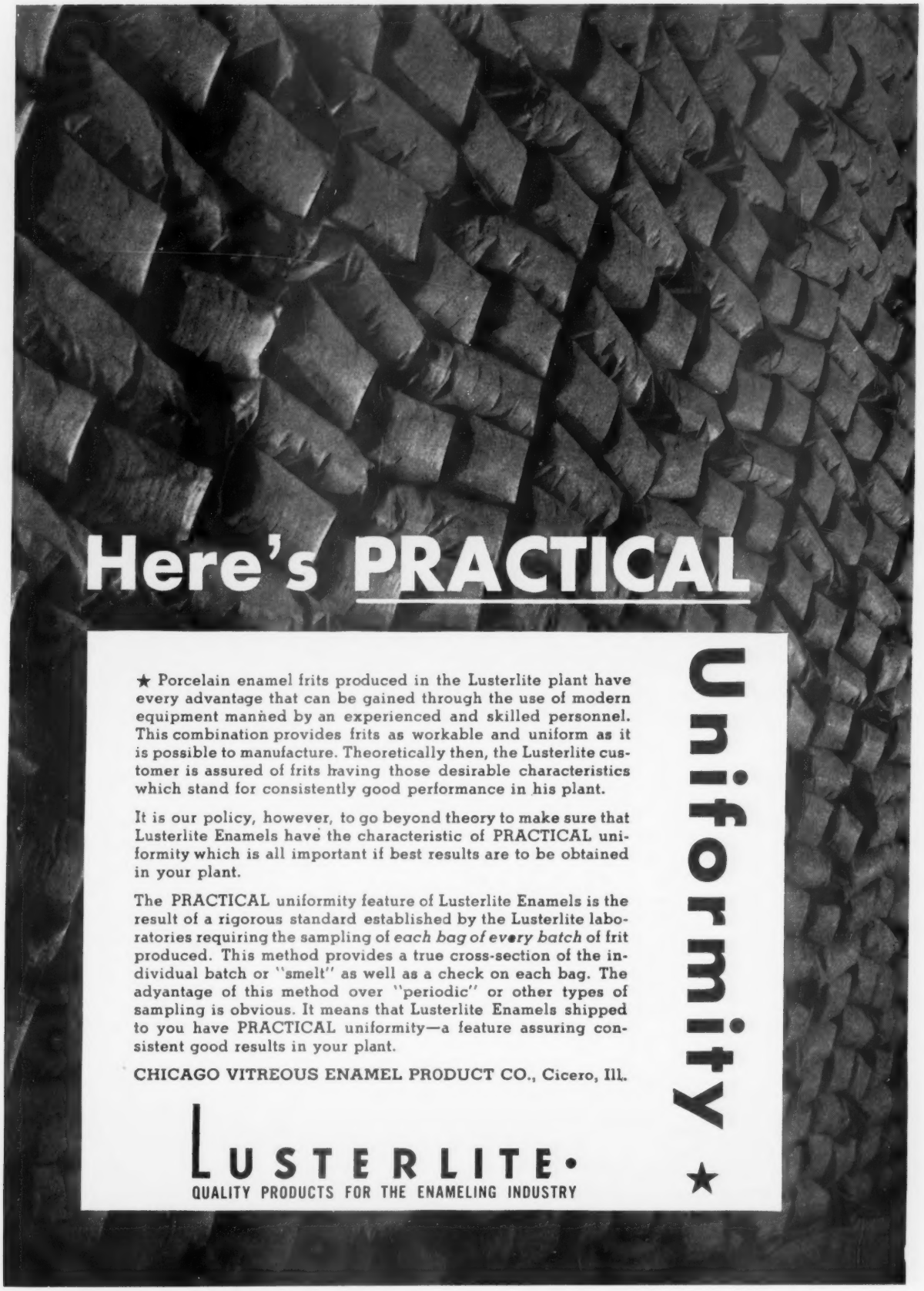
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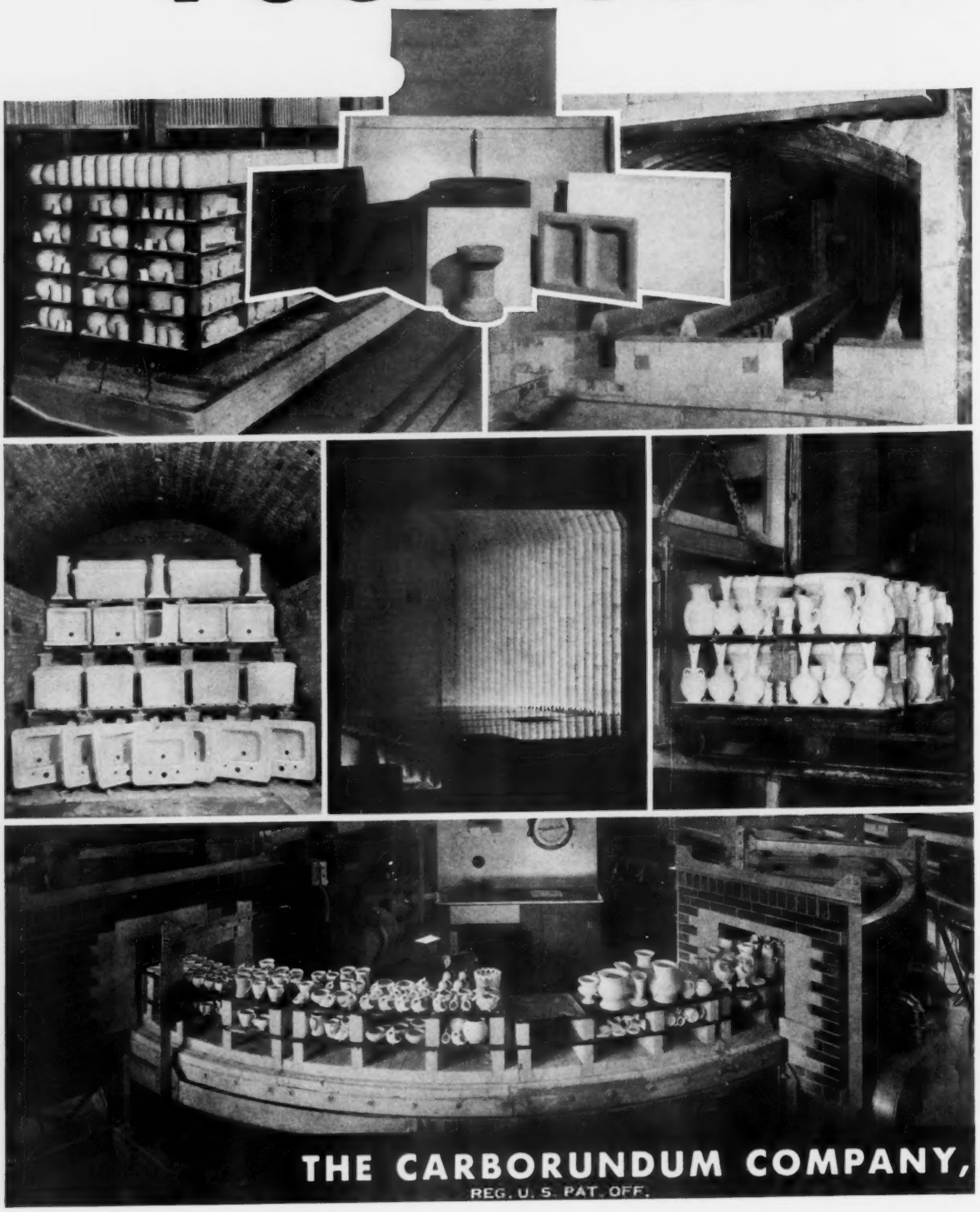

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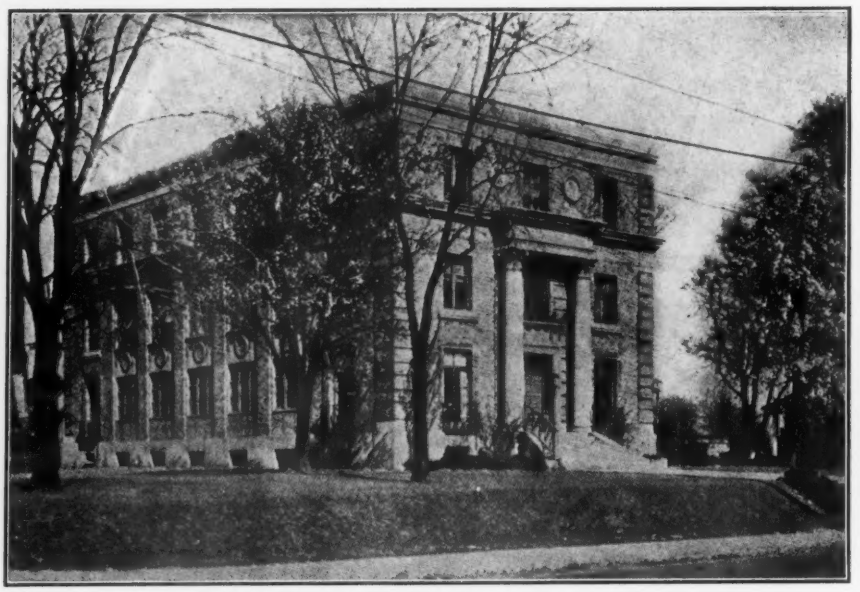

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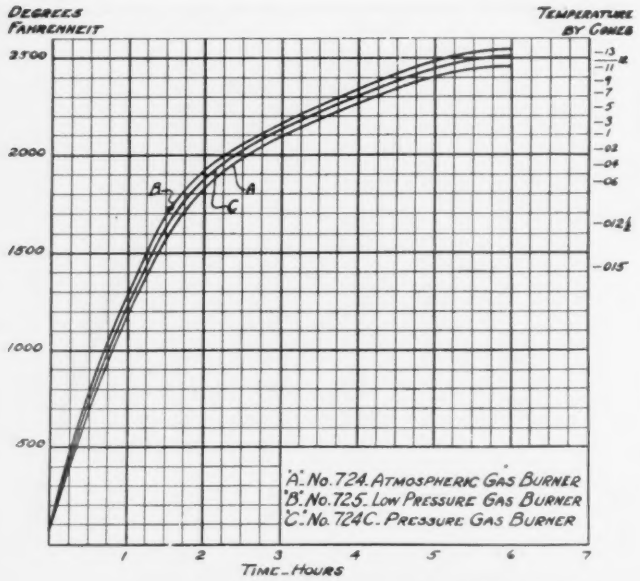

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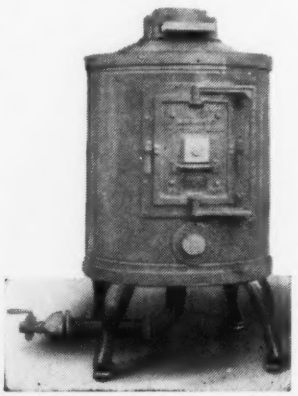

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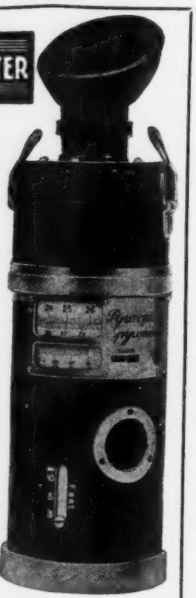

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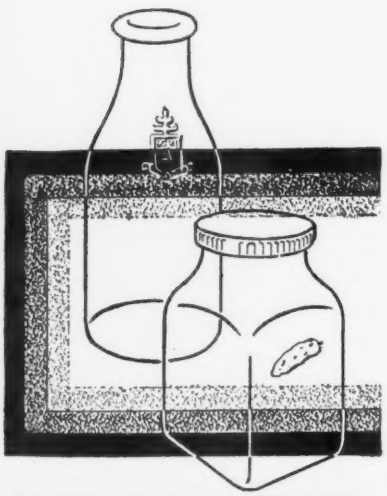

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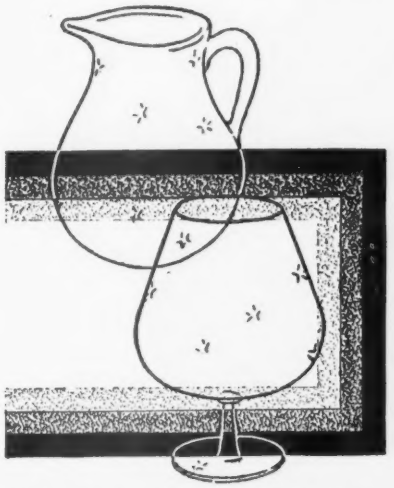

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